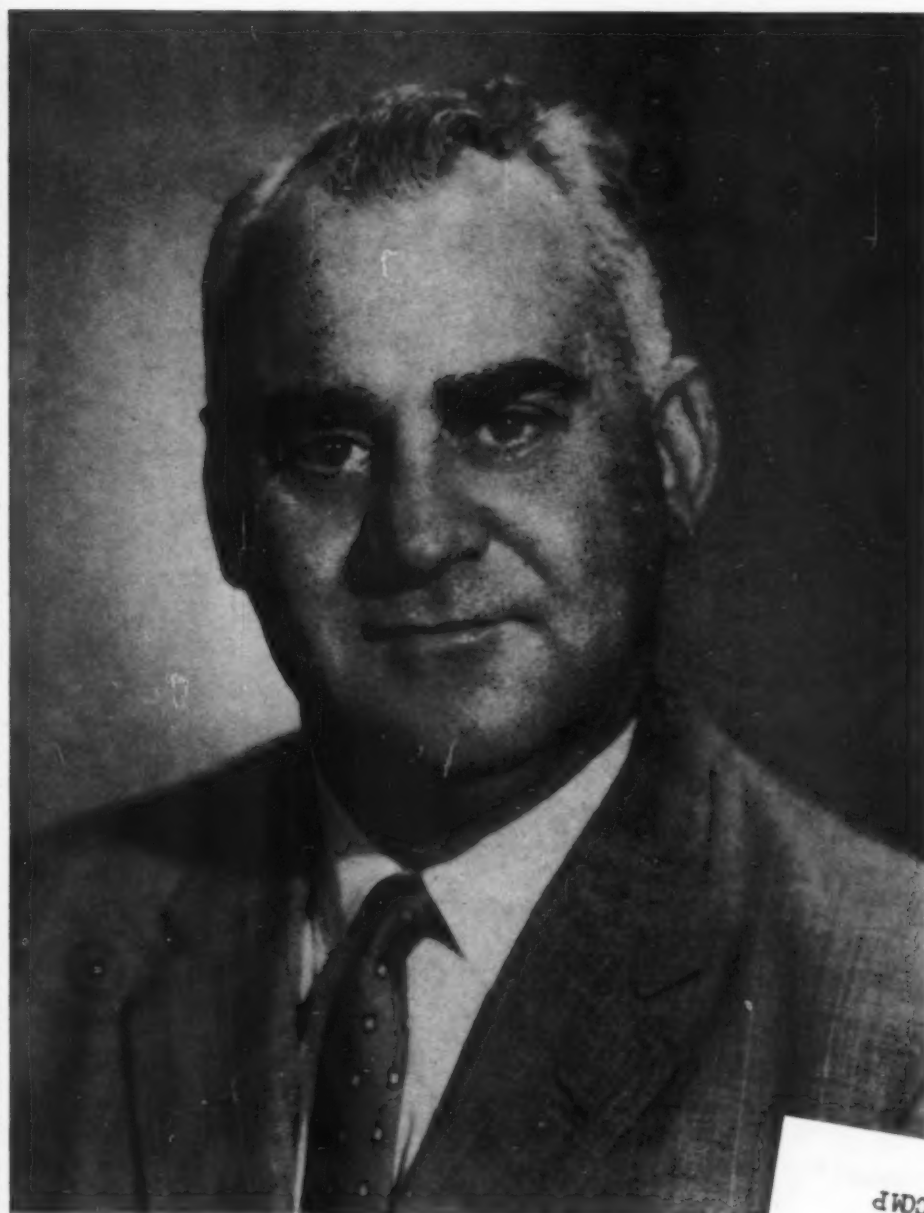


# FARM CHEMICALS

JULY 1961

50 CENTS

The management magazine of the industry



L. S. Kaniecki of Tennessee Corp. explains . . .

## Responsibilities of a sales manager

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additions to fertilizers  
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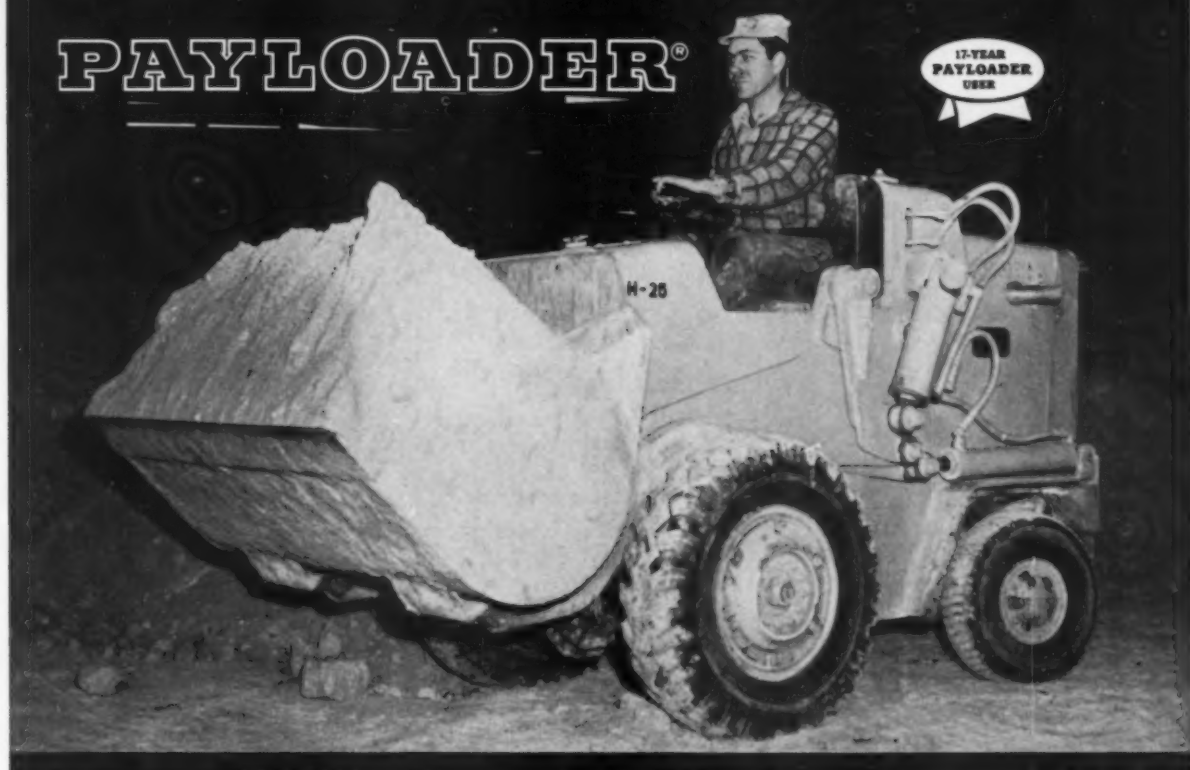
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#### MEMBER BUSINESS PUBLICATIONS AUDIT

The national business magazine for the fertilizer and pesticide industries, **FARM CHEMICALS**, serves primarily those persons responsible for management, marketing and production. It has a qualified circulation for selected executive and supervisory persons within specified segments of these industries, as well as in certain closely allied fields. Subscription rates to all others are: in the U.S., its possessions, Canada, Cuba and Panama: \$6.00; in other countries: \$7.50. Current issue 50 cents. Back issues \$1.00. (Current issues become back copies on the 5th of the month following publication.) Established in 1894 as *The American Fertilizer*.

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Vol. 124 No. 7 July 1961

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#### THE COVER STORY

What must a sales manager know about the men selling farm chemicals under his company's brand? How can he avoid some of the pitfalls that lie in every SM's path? This month, we're featuring the working philosophy of one of the industry's more well known sales executives—L. S. Kaniecki, Manager of Chemical Sales for Tennessee Corporation. Leon has a host of friends in the fertilizer business, having operated in Tennessee's Sales Department since 1940 (with a hitch in the Navy from 1941-45). In 1945 he was promoted to assistant sales manager, gaining his present position in 1954.



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## LETTERS

### HOW TO GET A HANDBOOK

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Gentlemen, I was very interested in your FARM CHEMICALS HANDBOOK that I saw in a friend's office. I would like to know how I would acquire a copy.

JOHN P. WEEKS

Director of Research and Education

CROSBY-HODGES MILLING COMPANY

Write to: FARM CHEMICALS HANDBOOK, 37841 Euclid Ave., Willoughby, Ohio.—EDITOR.

### INTEREST IN GARST

Terre Haute, Ind.

I noted the front cover of the December FARM CHEMICALS and the article picturing and quoting Roswell Garst.

Can you give me any family background of Mr. Garst? He received so much publicity when Mr. K visited his farms and several wondered how he came into the picture so prominently.

My information is that Mr. Garst has family relations in Russia. He has made several trips to Russia both alone and with his partner Mr. Henry Wallace. It seemed rather queer to me that nothing in this realm was ever mentioned in

this news. I wonder if you have anything on this subject in your files?

Very truly yours,

EARL PETTY

PETTY AGRICULTURAL PRODUCTS CO.

p.s. I have had a number of years experience with the Russians in the petroleum industry—was designated Petroleum Specialist to Gov. Harriman on his Mission to Moscow in the early 40's. On this trip I accompanied the crew of the first B-24 to circumnavigate the globe. Was introduced to J. Stalin by the President of Russia, Pres. Kalinin.

*Your comments are very interesting. I certainly plan to look into this and will write you again very soon. I have a deep interest in this fellow myself. He seems to be quite the authority in agriculture today.*—Ed.

### WHERE CAN WE BUY IT?

Dallas, Tex.

We are seeking a source of basic materials for compounding liquid mixed fertilizers, either organic or inorganic, but to date have been unable to locate such a source. We are wondering if you can supply us with a list of firms now

engaged in the manufacture or distribution of basic materials for compounding liquid mixed fertilizers . . .

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*I think the best source is FARM CHEMICALS HANDBOOK, which contains a complete Chemicals Buyers' Guide and a lot of other information that you would need. Write FARM CHEMICALS HANDBOOK, 37841 Euclid Avenue, Willoughby, Ohio.*—Ed.

### REPRINTS WANTED

Salt Lake City, Utah

Your March 1961 issue contains a letter to the editors referring to an article by Mr. Peter C. Crolus entitled "Complete Liquids: Increase and Uncertainty."

The article appeared in your April 1959 issue. Would you please send us six reprints of the article, alternatively one copy of the issue.

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*Sorry, but the article was so popular that our supply is exhausted.*—EDITOR.

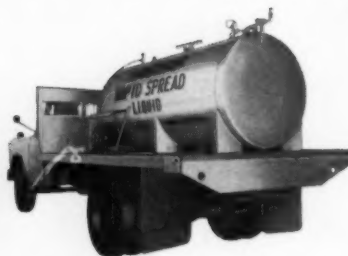
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# WASHINGTON VIEWPOINT

By GEORGE PETER

F  
C

- *The industry has emerged unscathed from the "farm battle of the century."*
- *Feed grain program brought in sign-ups of intentions to cut back 25 per cent.*

Even with the fire and smoke cleared away, it will take a few weeks yet before sense can be made of what has turned out to be the "farm battle of the century." Meaning the scrap over the Administration's farm bill.

Certain outlines can be seen, however. And barring political differences, the overall outcome has been good for business. The farm chemicals industry, an easy target for the role of innocent victim, has emerged virtually unscathed and none the worse for wear.

In the U.S. the food consumer will continue to eat and wear as much as ever.

On the export front—nothing but boom is expected ahead for some time. Sales are expected to increase greatly for dollars. But the U.S. will have to produce that much or more again for export in various foreign aid and peace-food offensives in the Cold War.

USDA expects wheat exports this year to reach 650 million bushels, a new record and almost one-half last year's crop. At this rate, the wheat surplus won't last long. Some experts think that within a few years the U.S. will need more wheat, not less. About 70 per cent of this figure is moving under P.L. 480, the remainder through other channels.

Soybean planting increase prospects this season have doubled what they were a month ago in the unofficial estimate. The July crop report will show the first official estimates. Reports from the heavier growing areas in the meantime indicate an increase of 4 million acres — or more. Percentagewise, spot estimates average increases out to 20 per cent.

What all this means, as New Frontiersmen see it, is that the agricultural plant must be kept up and methods adopted to keep agriculture from losing land to other interests. Some programmers already see 1975 as the target date for considering national planning for this purpose.

Fertilizers and other farm chemicals are expected to play an ever greater role in keeping up the farm plant to insure that the U.S. remains self-sufficient on this basis. This is also one of the factors influencing the new emphasis on keeping up farm income at all levels. USDA is also reviving the "keep 'em down on the farm" concept again as a method of keeping farming know-how alive.

Big feed grain cutback program brought in sign-ups of intentions to cut back about 25 per cent of the 1959-60 acreage. But official crop outlookers still say this is as much a switch in production as it is an overall cutback in all planted acreage.

This percentage of cutback, if farmers carry it out, adds up to nearly 25 million acres on about one million farms. The percentage is an average of about 23 per cent cut for corn and 30 per cent for grain sorghum. This far exceeded all expectations.

But there is already talk that the supply of corn, at least, may not equal utilization if the cutback continues at this rate. In addition, the export of feed grains is stepping up.

What the new planners want is something other than a dog-eat-dog method of production which could lead to an eventual near-monopoly of certain kinds of production. Some market specialists see less concentration as a form of protection for suppliers of the producer as well as for the producer. The eventual consumer will have to pay some of those increased costs, such experts concede, but they argue the consumer would have to pay even more if concentration of control in farm production became too great.

Continuing opposed to this concept, of course, are the "free agriculture" school of economists who believe, in brief, that the private economy doesn't need much manipulation by government.

In planning ahead, however, it is well to consider that the planners are in government currently and to some extent are in Control of Congress.



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# WHAT'S DOING IN THE INDUSTRY

F  
C

Two organizations which outgrew their old names are using new ones this month:

FMC Corporation is the name chosen by Food Machinery and Chemical Corp. FMC Chairman Paul L. Davies said the company, as one of the most broadly diversified producers of industrial and agricultural machinery, basic chemicals and defense materiel, had outgrown its name.

Atlas Chemical Industries, Inc. is the new name adopted by Atlas Powder Co. Since its incorporation nearly 50 years ago, it has grown from some 600 employees, 750 shareowners and \$5 million sales to nearly 3,600 employees, about 6,500 shareowners and annual sales of about \$80 million.

Some 65 plant food executives this month will study the problems of the hypothetical Makmor Fertilizer Co. and the problems encountered by President Will I. Makmor and his staff. The three-day Fertilizer Management Seminar to be sponsored July 19-21 by International Minerals & Chemical Corp. at Skokie, Ill., will cover 10 broad topics of executive concern—administrative management, financial management, insurance, purchasing, transportation, personnel development, public relations, marketing, production and future growth possibilities.

Temporary withdrawal of nearly 5,000 acres of potash deposits in southeast Utah from oil and gas leasing has been announced by Interior Secretary Udall. Udall said the lands, eight miles northwest of Moab, are reported to contain one of the richest potash deposits in the United States.

D. R. Fraser succeeds J. H. D. Ross, who retired, as president of Chipman Chemicals Limited. Fraser joined the accounting department of Canadian Industries Limited in 1939 and has held a number of administrative posts with the company. Last December he became vice president of Chipman Chemicals.

Burton F. Bowman, general manager of American Cyanamid Co.'s Agricultural Div., has been elected president of Cyanamid of Canada Limited, a wholly-owned Cyanamid subsidiary with headquarters in Montreal.

William M. Rohrer has been appointed general sales manager, agricultural chemicals, by W. R. Grace & Co. Davison Chemical Div. He is responsible for sales of Hi-Flo triple superphosphate, Florida phosphate rock, diammonium phosphate, normal superphosphate, phosphoric acid and sulfuric acid.

A Workshop on New Phosphorus Methods for Fertilizers is being held at Purdue University, Lafayette, Ind., July 6-8. Joint sponsors are the National Plant Food Institute, Association of American Fertilizer Control Officials and the Association of Official Agricultural Chemists. Two quinolinium methods, the spectrophotometric method and official volumetric method 2.020 will be studied.

Bulldozers broke ground June 15 for Northwest Cooperative Mills \$4 million ammonium phosphate plant near Pine Bend, Minn. Expected to be in operation by next April, it will turn out 100,000 tons of water-soluble ammonium phosphate a year. The plant will get phosphate rock from Central Farmers Fertilizer Co., reduce it to phosphoric acid with sulfuric acid, combine it with anhydrous ammonia from St. Paul Ammonia Products Co., and add potash.

The Georgia Plant Food Educational Society celebrated its 10th anniversary last month at a meeting in the Wanderer, Jekyll Island. The society, which has more than 350 members, operates throughout Georgia as an agricultural educational service and promotes the use of improved farming methods which result in production of better crops and increased farm income.

New units to make ammonium nitrate solution and ammoniated ammonium nitrate are being built by Hercules Powder Co., at its plant at Louisiana, Mo. They're expected to be completed in about a year.

W. Harold Schelm has been named executive secretary of the National Fertilizer Solutions Association, according to an announcement by Donald Humphrey, president. Association office is being moved to Room 901, Jefferson Building, Peoria, Ill. For the present "editing and publishing of Solutions Magazine, the official organ of the association, will be continued by the firm of Storms & Wescott of Chicago. . . ."



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# Responsibilities of the sales manager

**In developing your sales force  
do you . . .**

**Select men of high potential?**

**Develop their executive ability?**

**Instill in them corporate "belonging?"**

By L. S. KANIECKI\*

**A**S is true of many fields of endeavor, it is relatively simple to briefly state the objectives of sales management, but the methods and means by which the objectives are attained in this modern day and age become rather complex.

The chief job and responsibility of a sales manager can be defined very briefly. It is simply the job of building sales. In this all-important task of building sales, it is not only the methods which count but the final results.

A sales manager is judged by his associates and his company as a success or a failure totally on his ability to develop sales for the company. And because the development of profitable sales is the final criterion, judging a sales manager's performance is a relatively easy matter. No amount of hedging will alleviate the pain when sales fall off, and conversely, a good sales record is an accomplishment known to echelons of top management.

We all realize we are living in a modern day and age. The modern sales manager finds his job and responsibilities extremely more complex than did his predecessor of a short 20 or 25 years ago. To achieve the all-important sales goal, which is the life blood of all American corporations, the sales manager finds himself concerned with, in addition to the principal task of selling, many other responsibilities.

Some of these responsibilities would include marketing and research problems, selection and training of salesmen, advertising and sales promotion, modern concepts of human relations, and keeping abreast of the federal and

state laws affecting business practices.

To specifically outline some of the responsibilities of a sales manager, we would have to list selection of salesmen, training of salesmen, supervision of salesmen, advertising, sales promotion, sales meetings, sales forecasting, staying abreast of production problems, co-operating with research department, co-operating with marketing research department, establishment of sales territories, sales budgeting, packaging and shipping problems, credits and collections, establishment and maintenance of numerous sales records and customer contacts.

In small or medium sized companies the sales manager finds himself concerned with and responsible for just about all of the functions noted. In extremely large, heavily staffed organizations, some of the functions noted may become separate responsibilities of other departments. Even if the function becomes a separate responsibility, for example credit is turned over to a credit department, the sales manager is still involved.

In the space allotted, it would obviously be impractical to attempt to fully discuss each of the many specific responsibilities.

There are, however, three principal responsibilities which, in my opinion, are extremely important. It would be difficult if not impossible to attempt to assign degrees of importance to responsibilities. They are all of equal importance, and in order to successfully manage a sales organization, all factors must be given equal weight.

The three specific responsibilities are the selection and training of salesmen,

the responsibility for developing men capable of moving on to higher management positions within the corporation, and the responsibility for thoroughly indoctrinating sales personnel in company sales policies with the objective of assuring that the corporation gets the maximum return on its heavy capital expenditures for the manufacture of the products.

Those of us who work in the industry realize that our industry is a technical one, and consequently, it is extremely important for us to bring into and to retain within the industry high caliber men of a high degree of intelligence with good capability for growth.

Because of the technical nature of our business, we should strive to obtain men with a college degree, preferably in science, engineering, business administration or related subjects. In selecting these men, we should attempt to judge them in accordance with their background and their potential ability to accomplish the tasks to which they will be assigned.

Principally, we are looking for well qualified men with good backgrounds. We want men who want to work, who are capable of producing, who will enjoy their work and who can be trusted. We seek men, of course, who will make a favorable impression on the customer, since in most instances the salesman is the company for all practical purposes.

There are many, many routes which can be followed in selecting personnel. In our organization we lean heavily on personal interviews, obtaining all of the

*\*Manager of Chemical Sales, Tennessee Corp.*



background information possible from previous employers, for example, and our own particular personal appraisal of the applicant.

In the matter of training, we give principal initial emphasis to product training, with further training in sales methods and techniques, creation of an understanding of corporate sales policies, and so forth. Training is a continuous process and all of us can benefit from additional training.

#### FIELD TRIPS IMPORTANT

Since most sales managers find themselves snowed under with various detailed administrative functions, they may overlook the importance of getting out to the field whenever possible with their sales supervisors and their salesmen.

These occasional field trips can contribute a great deal to the development of sales personnel. When making such trips, the sales manager not only has an opportunity to observe the salesman's basic selling technique and technical competence, but also has a splendid opportunity to quietly and effectively correct whatever needs to be corrected. Of course, such correction should be done in the privacy of a hotel room.

A sales manager owes it to his personnel to make trips occasionally, and it is the responsibility of the sales manager to find time to accomplish this function. It is during such field trips that a sales manager can do much to encourage the sales personnel and to build up organizational morale.

Many of our salesmen operating at long distances from sales headquarters get the feeling that they are pretty much left out. The significant thing is to create within the sales organization a full sense of corporate belonging. Since it is extremely costly to the company to select and train men who do not demonstrate their ability for the specific job, obviously it is necessary to be extremely careful in this phase of our responsibilities as sales managers.

The second point I wish to make is the responsibility for developing men capable of moving on to higher management positions within the corporation.

It is a known fact that American industry has a continuing interest in developing men of executive caliber and potential. A recent survey conducted by *Fortune* magazine had some interesting things to say about the American executive. This particular article profiled 1700 top executives as to their background and other pertinent facts. What was said about chemical executives should be of interest.

First, chemical executives include

one of the highest proportions of college graduates, many of whom have acquired advanced degrees.

A very large proportion of chemical executives went to the top through the sales and marketing functions. In fact, the survey showed that in a great number of instances the first job of these executives was in sales and marketing.

Significantly, our industry is one with a decided tendency for personnel to remain with one company. For example, most chemical executives when reaching the top have worked for possibly just one other company. In the electronics industry, which is a relatively new industry, it is not unusual for the top executives to have worked for four or possibly five companies prior to their present employment.

The results of this survey indicate that within our specific industry sales and marketing functions, when judged in relation to attaining top positions, are extremely important.

With this in mind, it is obvious that the responsibilities of chemical sales executives to bring into the company men capable of development into executive positions is great.

Once the proper personnel are obtained, it is the responsibility of the sales manager to see to it that these personnel are developed as rapidly as possible, so that when openings of higher responsibility within the corporation occur, they will be available to step into those positions.

It is a matter of fact that the chemical industry has the policy of promoting from within. You can promote from within only if properly trained and qualified personnel are available for promotion.

#### INDOCTRINATION IS VITAL

The third and final point I would like to make is the responsibility for thoroughly indoctrinating sales personnel in company sales policies with the objective of assuring that the corporation gets the maximum return on its heavy capital expenditures for the manufacture of products.

It comes as no secret to those of us involved in the agricultural chemical industry and the chemical industry that it is extremely costly to do business today. Before a product ever hits the market, a tremendous amount of corporate effort, time, energy and money is required. The basic planning makes the valid assumption that the corporation will obtain adequate return for its investment. Because of this, it is incumbent on all personnel involved in sales to understand the necessity for obtaining this return.

We are in a highly competitive age, and sometimes we may be prone to

overlook the basic requirement of the selling endeavor, which is profitable sales.

There are some industries in the United States who find it possible to pass on to the consumer ever increasing manufacturing and other costs. This is not true in the chemical industry. Further, there are industries in the United States where the margin of profit on individual items sold is spoken of in terms of 30% or more of gross, rather than the modest gross profits to which we are accustomed.

Because we are involved in a competitive industry and because it is not always possible to return to the company increased manufacturing and other costs by obtaining higher prices for our products, it becomes necessary for sales managers in our industry to indoctrinate all sales personnel in this important matter.

All of us in sales must fully understand that there is no trick to giving materials away, but that it does take good, effective salesmanship to sell profitably. To indoctrinate the sales organization with this philosophy is a prime responsibility of the sales manager.

In our endeavor to keep up in sales, we sometimes overlook the fact that volume does not necessarily mean profit. Because of the highly competitive conditions which exist in the field, there is a tendency at times to be forced to under-price our products.

One of the best rebuttals to this procedure is to have our salesmen well trained, so that they can fully appraise the customer as to our special and advantageous position as a supplier.

In other words, salesmen must understand that they have to stress company position, integrity, product excellence and service rather than to run scared every time they bounce up against a competitive price situation. The responsibilities of the sales manager in fostering, encouraging and indoctrinating the sales organization in this principle cannot be overlooked.

Regardless of the direction our companies take — whether new marketing concepts or the old classic selling line — there will have to be products sold, and in selling them we will be dealing with people.

People problems seem to crop up all the time. The purpose of this article is simply to stress the importance of getting the right people into the organization, the importance of developing them, the importance of giving them good indoctrination, so that we can perform our basic responsibility — selling profitably. ☆

## MERCHANDISING AIDS PROMOTION

### Part VI

*What the Manufacturer can do for the Dealer*



# Stock Control Systems

*A dealer can use one of three types: seasonal only, seasonal variation, and steady staples. Here's how he should go about making a decision on what to use.*

By F. E. HARTZLER

**T**HREE major types of merchandise need control: seasonal only, seasonal variation, and steady staples. To select a control system one must first know the category in which his merchandise falls, for the type of system used depends on this decision.

The "seasonal only" includes such things as fertilizer for which the season is short and, once the season is over, it cannot be given away.

The merchandise with high seasonal variation is merchandise like propane gas which has some sales all year round but peaks up high in winter.

Staple merchandise is that merchandise which can be sold in fairly even quantity the year round. In this article we will consider the problem of controlling the "seasonal only" merchandise.

### DETERMINING THE SEASON

Highly seasonal merchandise repays control the most, but it is obviously the hardest to control. The weather and other factors can have a tremendous effect on the sales of this type of merchandise. Therefore it will pay to make a careful study of past records to find first, the season and then the high point of it. In soft lines stores, such as a women's ready to wear, high fashion seasonal merchandise is counted daily. In anything as seasonal as fertilizer a daily sales chart should be kept from

one year to the next. It should not be too difficult or time-consuming to read a tank meter, or count out tons delivered.

A form such as the one in the third column should be an adequate aid in plotting the season. This is, of course, only a sample used to illustrate a form. Nonetheless we can use it to point out the information that can be gathered from such a form from year to year. To begin with the first big day of the season in this chart is April 20th. The last big day is April 30th. This, then, constitutes the heart of the season.

The most ever delivered at one time is 40 tons; this may have required renting extra trucks, tying on lights for night deliveries, and hiring extra help. From this information one can begin to plan his operation and personnel for the coming year. From advance planning one can avoid shortages or over-supply during any part of the season.

This chart will also help you to select a day to begin offering seasonal allowances. From the information shown here the day would be April 30 with the cuts effective the morning of May 1st. On this day roughly 90 per cent of what you are going to sell for the season has been sold. You won't be losing money, actually, on sales at lowered prices after this date, and yet it won't be too late for the allowances to be effective.

By making out such a chart for your own sales on fertilizer you may find

CHART TO DETERMINE SEASONS

Date Sold	Tons of Fertilizer Delivered (Year)				
	1957	1958	1959	1960	Totals
April 15					
16	5				5
17	10				10
18	10	10		10	30
19	5	20		10	35
20	Rain	20		20	40
21	Rain	20		30	50
22	5	20		20	45
23	10	10		10	30
24	20	10		20	50
25	30	20		30	80
26	25	20	20	30	95
27	40	20	30	20	110
28	10	20	30	10	70
29	10	10	40	20	80
30	Rain	10	40	10	60
May 1	Wet		20		20
2	5		20	10	35
3	10		20		30
4	10		10		20
5					
6					
7					
8					
Totals	205	210	230	250	895

them remarkably steady from year to year. I know that they will not seem so. Everyone who relies on memory always spends a lot of time in needless worry, whereas some recorded evidence will reveal that things are much more ordinary than he had believed. You would not believe how predictable some sales in seasonal merchandise can be. This same method might be applied to other products, but usually it is reserved for highly seasonal products which are difficult to transport.

The first chart will plot your season, but it is not helpful in merchandise selection. This will take another chart.

### SELECTING THE MERCHANDISE

Whatever amount of merchandise you sold last year, you will not sell the same amount again this year. Fashions change in all kinds of merchandise, even in medical operations. It is up to a dealer to try to learn which particular

(Continued on page 36)

"Thanks  
for  
going  
steady....."



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Canadian Sales Office:  
2 Carlton Street, Toronto 2, Ontario

"

says Big Chief Kay-Two-Oh. And it's not Minnehaha he has in mind, but YOU, the loyal customers who've re-ordered Potash again for the coming season.

"Moon after moon (Indian bop talk for 'time after time'), paleface buyers prove faithful in ordering from Pee-Cee-A-Tribe. Me heap grateful." That's a long speech for the usually silent Big Chief. It's his way of saying "Thanks" for your contract, and of letting you know that he means to keep your good will by keeping Pee-Cee-A service the best this side of the Happy Hunting Grounds.

In closing the Chief says "How". Which means: if there's any way the Pee-Cee-A scout in your territory can be of service to you, send him a smoke signal and tell him "How".

When you're in Manhattan stop by the Chief's wigwam at 630 Fifth Avenue and let him make you welcome.

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PCA Coarse 60% Muriate of Potash  
PCA Granular 60% Muriate of Potash  
Potassium Chloride (99.9% KCL min.)  
Sulphate of Potash





An outstanding talk was presented by J. E. Streetman of Ralston Purina Company in explaining Purina's "Archway Program" of dealer development. He said we're looking for a "far bigger man" today.



Following the adoption of the budget, these NPFI leaders posed for a picture. Left to right: Elwood Lentz, vice chairman; Paul T. Truitt, president; and John Hall, chairman of the NPFI Board of Directors.

# NPFI Cuts Budget, Field Force

*... but newly-elected NPFI President John Hall of Potash Company of America says "programs will not be impaired"*

Is the NPFI cutting back its terrific fertilizer program—including the successful Intensified Soil Fertility Program? What about rumors of sharp cuts in its field force?

In accepting his newly won role as chairman of the NPFI Board of Directors, John Hall, president of Potash Company of America, answered these questions following the adoption of the budget at the annual NPFI convention at the Greenbrier, White Sulphur Springs, W. Va.

"There will be no major changes in the program of the National Plant Food Institute for 1961-62," Hall said.

## REDUCTIONS IN BUDGET

"There have been rumors and much misinformation concerning the course of the Institute as the result of some reduction in the budget," Hall added, "but these reductions will not impair the program for the organization or result in any de-emphasis of the traditional support and cooperation that the Institute has been privileged to enjoy with the land-grant colleges, agricultural workers, and others concerned with a sound agriculture."

Hall said that some reduction in personnel will be necessary under a reduced budget, but that "the regional approach to the problems of the industry and agriculture will be continued, largely within the present operational framework."

Elwood I. Lentz, vice president and general manager of Western Phosphates, Salt Lake City, Utah, was elected vice chairman of the Board.

Other officers of the Institute, all of Washington, D. C., were re-elected as follows: Paul T. Truitt, president; W. R. Allstetter, vice president; Louis H. Wilson, secretary; and William S. Ritnour, treasurer.

Members of the Executive Committee elected by the Board are: J. C. Denton, president of Spencer Chemical Company; James F. Doetsch, president of Chilean Nitrate Sales Corporation; Mr. Hall; Joseph J. Lanter, president, Central Farmers Fertilizer Co.; Mr. Lentz; William E. McGuirk, Jr., president of the Davison Chemical Division of W. R. Grace & Co.; C. T. Prindeville, vice president of Swift & Company; E. N. Shelton, vice president of The Tennessee Corporation; Fred J. Woods, president of The Gulf Fertilizer Company; and Mr. Truitt, (ex officio). J. D. Stewart, Jr., retiring Chairman of the Board and president of the Federal Chemical Company, remains on the Committee as an advisory member.

At the business meeting on June 12, members of the Institute elected 12 new members to their Board of Directors for terms expiring in June 1964, as follows: Willard Ashburn, Smith-Douglass Co., Inc.; Thomas W. Childs, Southwest Potash Corporation; Howard J. Gady, California Chemical Company; Robert

U. Haslanger, Escambia Chemical Corporation; Stanley Learned, Phillips Petroleum Company; Fred L. Litty, Northern Chemical Industries, Inc.; Edwin Pate, Dixie Guano Company; B. P. Redman, Jr., Farmers Fertilizer Company, Columbus, Ohio; Charles H. Riley, G. L. F. Soil Building Service, Ithaca, N. Y.; J. W. Rutland, Western Carolina Phosphate Company, Waynesville, N. C.; William C. Stark, Atlantic Fertilizer Corporation, Riverhead, N. Y.; Thomas M. Ware, International Minerals and Chemical Corporation.

Secretary of Agriculture Orville L. Freeman was principal speaker on the program which featured other prominent authorities in the field of agriculture, business and economics. He told NPFI members that "in a literal sense, agriculture is everybody's business . . . its problems are everybody's problems . . . its strength is the nation's strength . . . its weakness is a danger to the total structure of our economy."

Dr. Pierre A. Rinfret, vice president and director of the Economics Division of Lionel D. Edie & Company, New York City, made this prediction:

"The American economy has weathered the recession" and "new economic records are going to be made in the balance of this year."

*More convention photos in the August issue*



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Ammonium phosphate plant (right) is being moved for Simplot Co. from Montana to Pocatello, Ida., where it will be re-erected. Materials handling facilities from the former Anaconda triple plant (center) will be moved to Idaho Falls.

## MOVING DAY

for a complete fertilizer plant

**T**HE moving of a complete fertilizer plant more than 250 miles, from Anaconda, Montana to Pocatello, Idaho is in progress, it was announced by W. Grant Kilbourne, general manager of the Minerals and Chemical Division of J. R. Simplot Co.

The Austin Co. of Seattle, Washington has contracted to accomplish the gigantic job in 90 days. The task, which could be compared to moving an entire town, will be accomplished by dismantling the modern ammonium phosphate plant, moving the components by truck and rail to the Idaho site and re-erecting the production facilities in new buildings. Foundations and other prerequisite facilities are now under construction at Pocatello, Kilbourne said.

A large phosphoric acid plant which will double the present Simplot capacity is also under construction to supply the new facility.

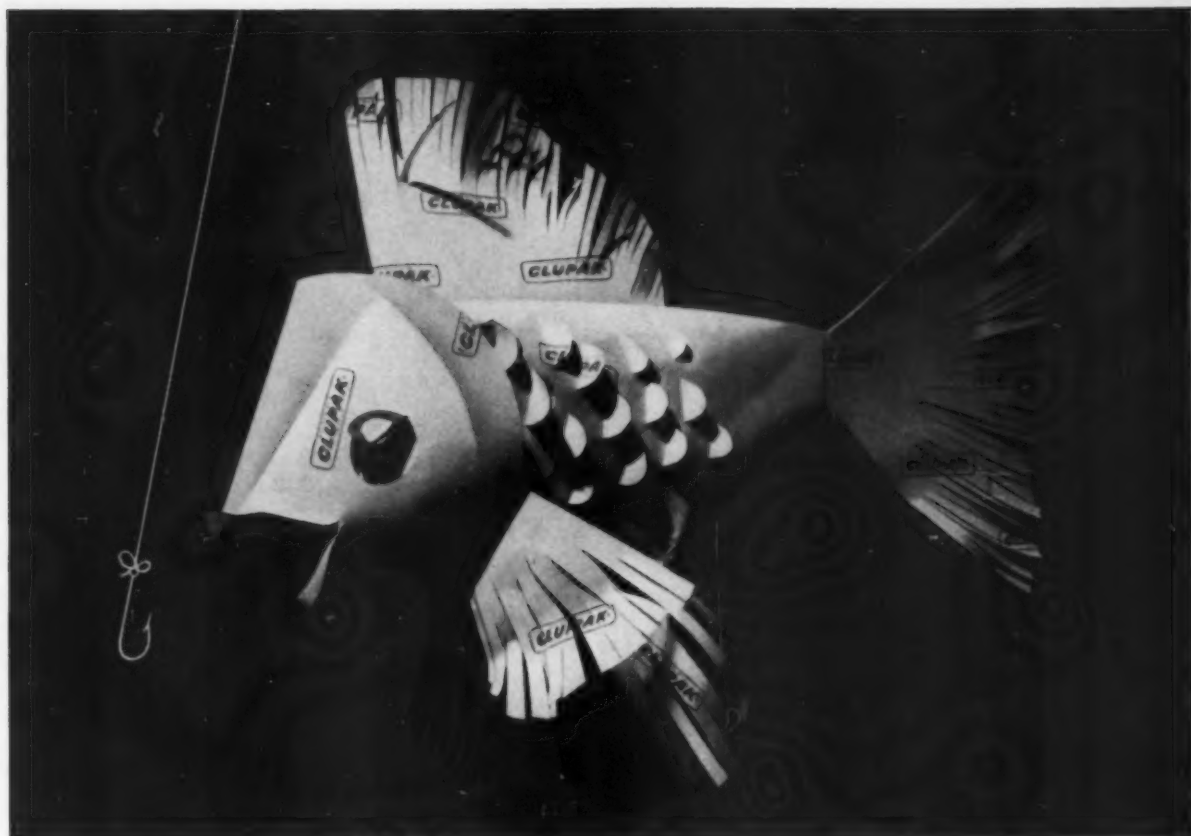
The Idaho location for the plant which is being moved is adjacent to the J. R. Simplot fertilizer plant near Pocatello. The ammonium phosphate plant was put into production three years ago by the Anaconda Co. It was purchased by Simplot and operated one season in Montana before being moved, Kilbourne said.

It was decided to move and reconstruct the plant at Pocatello to integrate fertilizer production facilities for the Minerals and Chemical Division. The new location is nearer the supply of raw materials, the phosphatic ore being mined at the Gay Mine near Fort Hall, Idaho and at the Conda Mine near Soda Springs, Idaho.

Materials handling facilities at the former Anaconda triple superphosphate will also be moved and incorporated in an expanded Simplot Soil-builders plant at Idaho Falls, according to Kilbourne. ☆



Site of the new plant is adjacent to the Simplot phosphate plant seen in the background.



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## MATERIALS HANDLING CUSTOM APPLICATION

Streamlined distributor, front view, shows 2 sections spaced 3 feet apart. Distributor ends are mounted 9 feet from center.



## DISTRIBUTING PESTICIDE GRANULES BY PLANE

**T**wo efficient ways to disperse granular herbicides and insecticides by airplane—from the wing and from a winglike attachment—are being developed by USDA scientists.

A specially equipped low-flying plane harnesses air currents from the wing or the attachment (called an airfoil), and from the propeller, to distribute the pesticide granules. Swaths up to 45 feet wide are easily treated, and there is less variation in pesticide concentration in the swath than when granules are applied from a plane with conventional application equipment.

This was determined in preliminary work at Forest Grove, Ore., by agricultural engineer V. D. Young and entomologist C. E. Deonier of ARS. They compared conventional methods of applying granules with the new techniques.

Experiments to improve conventional application methods began with the airfoil attachment installed beneath the fuselage of a high-wing plane and under the wing of a low-wing plane. Use of the airfoil created little drag on the forward motion of the plane and resulted in even distribution of granules.

As the granules were released further from the center of the airfoil, the swath made by the fallen particles became wider. But releasing granules from the ends of the airfoil produced a swath of only 28 to 30 feet.

To determine if use of a longer wing-

like distributor could produce a wider swath and provide even distribution and little drag, the scientists tried releasing granules from small hoppers mounted on the wing.

Best results were obtained by releasing granules about 9 feet from the center of the plane. At this point, the granules were spread evenly in a swath 40 to 45 feet wide.

One of the conventional distributors also created a swath of 40 to 45 feet. But concentration of granules released from this distributor was less uniform than when granules were released from the wing. Also, the shape of the conventional distributor caused considerable drag.

Conventional systems generally move granules from a hopper in the fuselage into an airstream produced by an airscoop in the underside of the plane. The granules are then dispersed through ducts, extending back under the wing, primarily into the propeller airstream.

Superior performance of the wing distributor may be due partly to air currents from the wingtips. These currents supplement air blown back from the propeller.

Young and Deonier are developing equipment to convey granules for release through the wing and from a larger airfoil. This equipment is being designed to disperse granules at a wide range of rates. ☆

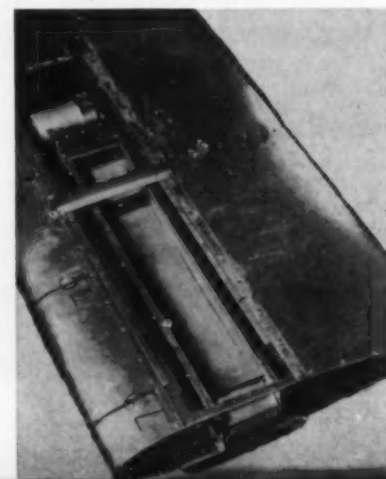


Airfoil (A) produced swath of 28 to 30 feet. Use of wing (B) widened swath to 45 feet. Letters A and B show approximate points of release.



Rear view of streamlined distributor mounted on Rawdon T-1 aircraft, showing granular discharge 9' outboard, left of center.

Top view of the streamlined distributor shows small belt conveyor used in test model, mounted between spars of distributor.







A Monco, Inc., 320-gal. type 304 Stainless Steel tank made by Progress Manufacturing Co., mounted on Tryco Manufacturing Co. fertilizer solutions applicator.

## Only a Stainless Steel tank can handle all liquid fertilizers

Dick and Dave Edwards, partners in Monco, Inc. of Monmouth, Illinois, make and custom spread liquid mixed fertilizers, and they sell and spread nitrogen solutions. For trouble-free handling of these corrosive mixtures, they use Stainless Steel liquid fertilizer tanks—320-gallon spreader tanks and 1000-gallon nurse tanks. Only Stainless Steel tanks are versatile enough to handle all these chemical solutions.

Stainless tanks help get the job done fast, because screens, booms and nozzles don't clog-up and have to be cleaned out. This dependability is especially important when customers rent the tanks. And Stainless Steel is so strong—no cracking or failure of tanks and booms

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# SPHALERITE

*for zinc additions  
to fertilizers and into soils*

By WALTER H. MacINTIRE\*

**T**HE NUTRITIONAL value of zinc for vegetation was revealed by Sumner and Lipman (24) in 1926, and was reported upon further by Sumner (23) in 1928; and by both Thomason (25) and Johnson (7), in 1933. The element is now recognized universally as being essential for good plant nutrition; whereas paucity of it in the soil is known to cause functional disturbances such as "rosette," and "white bud" in particular plants.

The California findings have been implemented most extensively in Florida, where the practical value of zinc sulfate has been demonstrated most convincingly and reported upon through publications that dealt with vegetative spraying; soil reactions; fixations of the zinc ion; zinc-induced toxicity and techniques for analyses of plants and soils. (1, 2, 4, 5, 6, 9, 15, 16, 17) Vegetative analyses were reported also by Johnson, et al., in 1959 (8). Deficiencies of zinc and need for it in certain rock-derived soils and the inadmissibility of mixing zinc sulfate and limestone, prior to their joint incorporation, were dealt with in recent contributions from the Tennessee Agricultural Station (20, 21).

## Reports of Caking Caused by Additions of Soluble Zinc Salts to Mixed Fertilizers

Because of good plant response from zinc sulfate, as sprays and as additions of it to soils, there came consumer demand for its inclusion in mixed fertilizers. In 1957, however, Maynes and Dee (15) reported that caking resulted when zinc sulfate was slurried into mixed fertilizers and in 1959, Caro, Freeman and Marshall (3) also reported that inclusions of the sulfate, and also

other soluble salts of zinc, caused mixed fertilizers to become caked. They advanced equations to explain the phenomenon and reported, also, that zinc sulfate inclusion did not cause caking in pre-ammoniated fertilizers.

## Inclusions of Sphalerite to Provide Zinc in Fertilizers

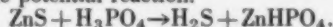
Because of the reported chemical reactions and resultant physical effects from inclusion of soluble zinc salts in mixed fertilizers, it seemed worthwhile to consider inclusion of an economical non-reactant zinc carrier that would not cause caking, yet would provide available zinc in the soil. Unless both requirements could be met, the proposed inclusion of an inert zinc material would not be tenable.

Exploratory search indicated that sphalerite additions might not induce caking of mixed fertilizers, and its inertness therein was determined when it was suspended in orthophosphoric acid and through its inclusion in mixed fertilizers. The fines (Table I), used in obtaining the data of Tables II and III, were obtained through their flotation from finely ground dolomite and afforded extensive surface reactions by the components of acidic fertilizers.

## Inertness of Sphalerite Suspensions in Orthophosphoric Acid

Of primary importance was whether sphalerite additions to acidic phosphates, under most intensive conditions,

would induce liberation of hydrogen sulfide, according to the equation for the potential reaction.



No emission of that gas occurred when a 50-gm charge of -65-mesh sphalerite was stirred an hour into 100 m.l., of 85 percent  $\text{H}_3\text{PO}_4$ . A like charge then was stirred into each of the six aqueous  $\text{H}_3\text{PO}_4$  systems of Table II for 30 minutes at 30°C.; but nasal test gave no indication of  $\text{H}_2\text{S}$ . The six beakers then were covered with lead acetate-impregnated papers (125 C.M. S&S 589) for an additional 30-minute contact at 30°C. Again there was no indication of  $\text{H}_2\text{S}$  by five of the six filter papers; a faint indication of that gas did appear, however, on the paper that covered the 1+1 system, No. 6, which contained 42½ percent of  $\text{H}_3\text{PO}_4$ .

After the six sphalerite suspensions had been kept at 30°C., throughout the two successive 30-minute intervals, they were boiled and resultant vapors were tested for  $\text{H}_2\text{S}$  by means of lead acetate papers. The boiling gave no indication of that gas from the four less concentrated systems (Nos. 1, 2, 3, 4); but the 1+1 and 1+3 boiled systems (Nos. 5 and 6 gave faint positive tests to lead acetate.

In an additional test (System 7 of Table II) a 50-gm charge of an 18.3 percent superphosphate was stirred 45 minutes continuously in 100 ml of distilled water. The mixture then was filtered immediately and the resultant leachate was found to contain half of the monocalcium content of the superphosphate charge. When a 50-gm charge of -65-mesh sphalerite was suspended in the leachate and the suspension was stirred 45 minutes at 30°C., no indication of  $\text{H}_2\text{S}$  was detectable by either nose or acetate paper, nor when the suspension was boiled.

The range of dilutions in the seven systems of Table II were thought to simulate any incidence of "free" phosphoric acid in mixed fertilizers and potential development of it through hydrolysis of the monocalcium content of an acidic mixed fertilizer, as indi-

TABLE I  
Sphalerite "Fines" Obtained Through Flotation from Dolomite

From Cyclone Spigot (a)			From Cyclone Overflow (b)		
Screen	Percent	Assay (c)	Screen	Percent	Assay (c)
+ 35	0.6	.....	.....	.....	.....
- 65	21.0	57.8	- 65	3.2	61.6
-100	20.0	60.8	-100	3.6	58.6
-150	18.1	62.3	-150	5.6	63.2
-200	13.1	63.4	-200	6.4	63.8
+200	27.2	63.7	+200	81.2	63.6

(a) Low content of Copper; was used in obtaining data of Tables II and III.

(b) High content of copper.

(c) Zinc content 61.21 percent (91.11 percent purity).

\*Retired, Emeritus Head of Chemistry Department, The University of Tennessee Agricultural Experiment Station, Knoxville. Formerly Principal Chemist, Tennessee Valley Authority. Present address, 4201, 28th Ave. North, St. Petersburg 13, Florida.



# ONE

## BASIC SOURCE FOR FERTILIZER CHEMICALS

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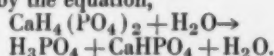
### Foliar Nutritional Products —

Iron, Zinc and Manganese Compounds—Nu-Iron, Nu-Z, Nu-Manese and Es-Min-EI (a foliar applied mineral mixture).

## TECHNICAL REVIEW

### SPHALERITE (Continued)

cated by the equation,



On the other hand, the more concentrated systems were deemed to be far more intense than those to be encountered in mixed fertilizers containing additive sphalerite.

#### Trials of Sphalerite Additions to Acidic Mixed Fertilizers

After it had been demonstrated that sphalerite remained inert while suspended in the 7 acidic systems of orthophosphates of Table II, its stability then was tested further through additions of it to mixed fertilizers, as described in the following section.

Additions of 3 and 5 percent of -65-mesh sphalerite, representing 35 pounds and 51 pounds of zinc per ton of fertilizer, were made to 50-pound bagged lots of two representative fertilizers, 6-6-6 and 12-6-6, at point of manufacture. The smaller of the two additions was about twice the amount that would be added ordinarily to an acre of soil through a corresponding incorporation of fertilizer.

The four bags of the treated fertilizers and the bags that contained no sphalerite were sealed and stored on wood benches in a concrete garage at the port of St. Petersburg, Florida. When the sealed bags were opened about four inches after 17 days no indication of  $\text{H}_2\text{S}$  liberation was detectable and the condition of every bag was good. After the bags were kept closed during subsequent intervals of 18 days, 36 days and 8 months and one year, there was no detectable emission of  $\text{H}_2\text{S}$  in any bag and caking had not occurred.

Subsequent to the foregoing evidence as to the feasibility of sphalerite additions to mixed fertilizers, the sec-

ond important consideration was whether such additions would undergo oxidation in the soil, and thereby supply nutritional zinc to vegetation. A corollary was whether such transition would come through biochemical processes or from direct chemical reaction, or through a combination of the two phenomena. Therefore, fate of sphalerite additions to the soil will be dealt with in the two sections that follow.

#### Biochemical Oxidation of Sulphides in Laboratory Cultures

In 1922, Rudolphs (18) reported findings from laboratory cultures that established the ability of a *specific bacterium* to supplement chemical oxidation of metallic sulphides and concluded that "iron pyrites can be attacked by microorganisms and changed into the sulfate form," although his analyses showed that the sulfonation was responsible for only small fractions of the over-all oxidation. Also in 1922, Rudolphs and Hekbrunner (19) stated that "little is known about the influence of microorganisms upon oxidation of metallic sulfides" and "other than the findings reported by Rudolphs, nothing else is on record as to possible biological reactions of metallic sulfides."

Those authors also wrote, "Under conditions of natural exposure, hydrogen sulfide and metallic sulfides are slowly oxidized"; and cited supporting conclusions from Kappen and Quensell (10), Van Bemmelen (26) and also by MacIntire, Gray and Shaw (12), who demonstrated that oxidation of sulfur can occur under sterile conditions even in its mixtures with  $\text{CaCO}_3$ , as well as in uninoculated soils outdoors (13).

#### Oxidation of Additive Sphalerite in Outdoor Soils

Although no sphalerite incorporation had been reported in the literature available, an input of that mineral had been made unintentionally, because of its occurrence in the dolomite that was incorporated in amounts respectively equivalent to burnt lime ( $\text{CaO}$ ) controls per acre 2,000,000 pounds of soil, in an 8-year lysimeter experiment at the Tennessee Agricultural Experiment Station (13). The heavier incorporations of dolomite were designated as being 32 and 100 tons; and, for brevity, those designations will be used in the succeeding mention of such additions. Actually, however, the incorporations were 60.4 tons and 188.7 tons per acre, upon basis of the  $\text{CaCO}_3$  equivalence of  $\text{CaCO}_3\text{MgCO}_3$  content. Each incorporation was in duplicate and carried respective inputs of 3425 pounds and 10,700 pounds of zinc sulfide per acre, which were potential for 5675 pounds and 17,730 pounds of zinc sulfate. Measure of oxidation of the  $\text{ZnS}$  carried by each dolomite incorporation was through enhancement of sulfates carried by the rainwater leachings, correction being made for the sulfate outgo from the soil that did not receive dolomite.

Accordingly, the 310-pound increase in  $\text{SO}_3$  outgo, (equivalent to 377 pounds of  $\text{ZnS}$ ) attributable to the 3425-pound input of  $\text{ZnS}$  (2804 pounds of  $\text{SO}_3 \times 1.217$ ) in the "32-ton" incorporation represented an eleven percent oxidation of its sulfide content, or an average oxidation of 47 pounds of  $\text{ZnS}$  per acre per annum.

In the corresponding computation, the 10,700-pound zinc sulfide content (8793 pounds of  $\text{SO}_3 \times 1.217$ ) of the

TABLE II

#### Inertness of Sphalerite In Contact With Six Dilutions of 85 Percent Orthophosphoric Acid (a)

System Number	Water Additions, M1. to 1 ml. of Acid	Tests for Emissions of Hydrogen Sulfide		
		Nasal	Reaction to Lead Acetate Paper	
		After 30 min. (b)	After 60 min. (c)	When Boiled (d)
1	500	None	Negative	Negative
2	250	"	"	"
3	100	"	"	"
4	7	"	"	"
5	3	"	"	Positive
6	1	"	Positive	"
7	Superphosphate Leachate (e)	Negative	Negative	Negative

(a) Charges of 65-mesh sphalerite, 50 gms. per 100 ml. of each acidic system.

(b) At 30°C.

(c) Each beaker was covered with a lead acetate-impregnated filter paper, 5 x 5 589, 125 mm.

(d) Subsequent to the two 30-minute contacts of (b) and (c).

(e) A 50-gm. charge of an 18 percent superphosphate was leached with 100 ml. of water; a 50-gm. charge of 65-mesh sphalerite was introduced into the leachate and the mixture then was stirred 45 minutes continuously and tested as in (b), (c) and (d).

TABLE III

#### Inertia of Sphalerite Additions To Fertilizers

6-6-6 Mixture		
Additions Percent	Nasal Test for $\text{H}_2\text{S}$	Condition of Mixture (a)
None	Negative	Good
3	"	"
5	"	"
12-6-6 Mixture		
Additions Percent	Nasal Test for $\text{H}_2\text{S}$	Condition of Mixture (a)
None	Negative	Good
3	"	"
5	"	"

(a) After intervals of 18 days, 36 days, eight months and one year.



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## TECHNICAL REVIEW

### SPHALERITE (Continued)

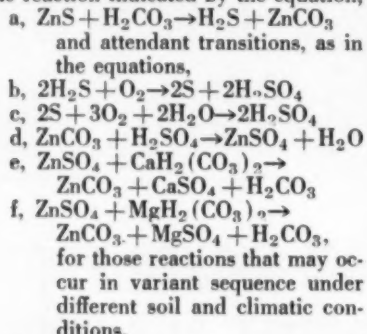
"100-ton" incorporation of dolomite yielded the 961-pound corrected  $\text{SO}_3$  leaching (2093 minus 1132), which represented a 1170-pound oxidation of ZnS per acre, or 146 pounds per acre per annum.

The substantial percentage oxidation of the unintentional inputs of sphalerite indicate ready transition of the mineral sulfide into zinc solutes in the soil, although the heavy-rate incorporations of 100-mesh dolomite probably served to coat and protect the occluded sphalerite.

Oxidation development of zinc solutes in the dolomited soil systems was merely transitory, however, the zinc ion having been exchanged for leachates of calcium and magnesium, and retained by the soils.

### Reactions and Fate of Sphalerite Additions in Soils

Because the rainwater leachings from the heavy-rate incorporations of dolomite were charged with solutions of calcium and magnesium bicarbonates, the resultant related soil systems could contain no acid other than the lightly-bound  $\text{H}_2\text{CO}_3$ . Therefore, the enhancements in the rainwater leachings of sulfates from the sphalerite in the dolomited soils appear due to the reaction indicated by the equation,



Because of the avidity of sulfur for iron, the  $\text{H}_2\text{S}$  engendered from ZnS in the soil might be captured there as ferrous sulfide, which would become oxidized into ferrous sulfate to supply nutrient iron and  $\text{SO}_4$ .

It has been concluded that the enhancements in sulfate outgo from the lysimeter soils were resultant from oxidation of the ZnS content of the sphalerite carried by the dolomite incorporations, because of "reactions of both chemical and biochemical nature, until more data are at hand relative to geochemical actions in alkaline calcium-magnesium media." (13, p 39).

Supporting evidence of the ready oxidation of ZnS in uninoculated outdoor soils was obtained through separate incorporations of iron pyrites, elemental sulfur, and ferrous sulfate at

rate of 1000 pounds sulfur-equivalence per 2,000,000 pounds of acidic soil, each additive being with and without a light or a heavy supplement of CaO or MgO. The 5-year leachings of sulfates by 250 inches of rainfall effected near-complete recoveries of potential sulfates from both pyrites and sulfur, in comparison to sulfate outgo from the  $\text{F}_2\text{SO}_4$  addition.

The cited oxidations of the two mineral sulfides, and of elementary sulfur in the lysimeter soils warrant the conclusions that inputs of sphalerite fines can provide vegetation with adequacy of zinc in both limed and unlimed soils.

### Practical Aspects of Sphalerite Additions to Fertilizers and into Soils

The inertness of sphalerite is such that fines of it can be added to mixed fertilizers with economy and without fear of either chemical or physical effect. Rate for additions should be governed by particular need for nutritional zinc in vegetation and in soils of various types and areas.

In general, a soil's inherent oxidative capacity should assure rapid conversion of additive sphalerite into available forms of zinc, and oxidation of the fines in sandy soils probably would be more rapid than in the heavy types. With normal soil supplies of calcium and iron, developments of acidity and toxicity would not ensue.

The lysimeter data demonstrated that direct incorporations of sphalerite undergo oxidation even in unfertilized soils. With inclusions of the mineral zinc sulfide in fertilizers, however, the farmer would not have to make separate purchase and incorporation of a needful zinc material, and he would be assured that an input of it would be at rational rate.

### Summary and Conclusions

The listed references cover the early disclosure of the nutritional value of zinc for vegetation; experimental and practical evidence of plant response to the sulfate; possibility of toxicity from undue amounts of soluble salts of the element; soil fixation of the Zn ion and possible repression of its availability in soils unduly limed.

Beneficial effects of zinc sulfate for particular vegetation on soils of certain areas brought zinc sulfate additions to mixed fertilizers; but these additions caused objectionable caking.

Consequently, sphalerite inclusion was proposed to provide zinc to fertilizers and to obviate caking.

The inertness of the mineral was established when charges of it were sus-

pended in orthophosphoric acid of seven different concentrations at 30° C, and at boiling, without effecting nasally-detectable emission of hydrogen sulfide.

Additions of 3 and 5 percent of -65-mesh sphalerite to two representative mixed fertilizers did not cause emissions of  $\text{H}_2\text{S}$  and had not induced caking after storage intervals of 18 days, 36 days, eight months and twelve months.

Cited laboratory studies indicated that inoculation of a specific bacterium served to supplement direct chemical oxidation of certain added sulfides (18,19); whereas other citations reported direct oxidation of uninoculated sulfur materials (10,11,12,26,27).

Although, the literature available did not record an incorporation of sphalerite, inputs of the mineral sulfide had been made, unintentionally, because of its presence in dolomite additions in outdoor lysimeters. The consequential oxidations were registered through enhancement in the 8-year outgo of calcium and magnesium sulfates resultant from exchanges with the engendered  $\text{ZnSO}_4$ .

Supporting evidence of ZnS oxidation in soils was registered through near-complete oxidations of incorporations of pyrites and sulfur (1000 pounds of S per acre), with and without supplements of Ca and Mg, at light and heavy rates.

In absence of a specific bacterium (18), the substantial oxidations of the sphalerite content of the dolomite in the uninoculated loams, are deemed attributable entirely to direct chemical transitions of ZnS into transitory zinc solutes, with concomitant soil fixation of the zinc ion.

### ACKNOWLEDGMENT

Appreciation is accorded The American Agricultural Chemical Company, at Pierce, Polk County, Florida for providing the phosphoric acid, fertilizers and analyses given in Tables 3 and 4, and to The American Zinc Company of Tennessee, Knoxville, for the sphalerite fines and analytical data of Table I.

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- (Continued on page 36)



## How to buy Anhydrous Ammonia and Nitrogen Solutions

*by George Day*

**About the Author.** Twenty-four years' experience serving customers are George Day's qualifications for writing about buying and selling an industrial commodity. For the last six of his 24 selling years, George has been working with customers who buy Ammonia and Nitrogen Solutions.

\* \* \*

In the purchase of  $\text{NH}_3$  and Nitrogen Solutions, look for a supplier with a good reputation. This kind of supplier has built up his good name probably over many years at great expense and he has a strong desire to

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exactly when to expect delivery, and knowing intimately the routing and timing of shipments are items to look for when deciding on an Anhydrous Ammonia and Nitrogen Solutions supplier.

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## NEWS OF THE INDUSTRY

**Texas Gulf Sulphur Co.**'s new potash mine, now under construction in Utah, is expected to increase the company's earnings by at least \$5 million a year, President Claude O. Stephens said recently. Stephens said that the \$30 million potash project is expected to be financed "entirely from retained earnings." Based upon thorough tests, "we believe this to be the richest known potash reserve in the United States," he reported.

**Cortez Chemicals Co.**, a division of Arizona Fertilizer and Chemical Co., recently held open house at its new office and laboratory at 734 E. Southern Pacific Drive in Phoenix. Among the products it manufactures are insecticide emulsifiers and cleaners for manufacturing and maintenance.

**International Minerals & Chemical Corp.** is making available a royalty-free license for the manufacture and use of an improved fertilizer sampling tube which it patented earlier this year. The tube was designed to overcome clogging in operation. In addition, the sample receiving slot has been widened to receive the proper proportion of all particles. IMC researchers say it has proven particularly effective with granular fertilizer material.



Demonstration shows ease of operation and freedom from clogging in new sampling tube, which IMC says has produced superior results in its tests. Handle portion remains free of material.

**Monsanto Chemical Co.** has an option on about 500 acres of industrial land four miles south of Muscatine, Iowa, on the Mississippi River. The company's Agricultural Chemicals Div. is considering the tract as the site for a 15,000 ton anhydrous ammonia terminal. They have 'til August 1 to exercise the option.

On July 1, **Escambia Chemical Corp.** assumed responsibility for the sale of its nitrogen products manufactured at Pace, Fla., according to a joint announcement by **Ashcraft-Wilkinson Co.** and Escambia.

Escambia's nitrogen sales and technical service organization will be headquartered in Atlanta, with sales representatives located in the Southeast marketing area served by its plant.



**W. N. Watmough, Jr.** (left) and **D. N. Hausman** (right), vice presidents of **W. R. Grace & Co. Davison Chemical Div.**, are shown with members of the American Agricultural Editor's Association at an inspection of Grace's Washington Research Center facilities at Clarksville, Md. The tour was taken in connection with the association's annual meeting in Washington, D. C.

**Velsicol Chemical Corp.** has made a new film available to dealers for group showings. In color and sound, the 16 mm film titled "Lawn and Garden Insect Control" runs about 14 minutes. It will enable dealers to educate their customers to recognize lawn and garden insects, the damage the insects cause, and how to control them. The film was produced by Iowa State University in cooperation with Velsicol.

A new \$52,000 custom fertilizer blending plant has been opened by **Midland Cooperatives, Inc.**, at Kiel, Wis. Leonard P. McCracken, Jr., is plant manager.



Taking part in the recent ground-breaking ceremony at the Cherokee, Ala., nitrogen plant of **Armour Agricultural Chemical Co.** were **E. W. Wilson**, president of Armour and Co., Governor **John Patterson** of Alabama, and **William Wood Prince**, chairman of the board and chief executive officer of Armour and Co. The new plant, said to be the largest of its kind in the country, is scheduled for completion in the first quarter of 1962.

**California Chemical Co.**, Ortho Div., has consolidated its Mid-Atlantic and western New York districts. According to **M. E. Wierenga**, Ortho's marketing manager and vice president, the move will give the company more effective customer contact and will result in administrative and equipment economies.

Manager for the district is **Robert T. Wallace**, currently managing the Mid-Atlantic district. **Dr. L. L. Pechuman**, former district manager of western New York, will headquarter at Medina, New York, representing both Ortho marketing and research departments on new product development, covering eastern Canada and the eastern United States.

A new export drive is planned by **Fisons**, particularly in South America and the United States. The Financial Times, London, recently reported. **Fisons Chemicals (Export)** has been reorganized and given a new name, **Fisons Overseas**.

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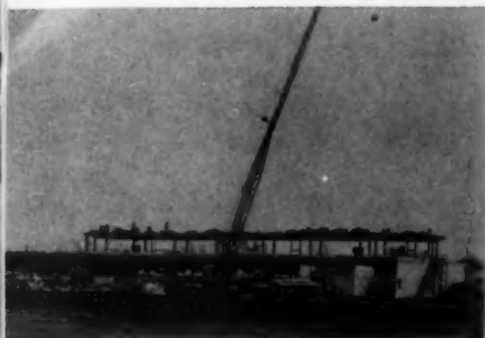
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## NEWS OF THE INDUSTRY



A research laboratory emerges. Progress is in evidence here on Niagara Chemical's new research laboratory under construction at Middleport, N. Y. Upon completion in the fall, it will engage in a search for new pesticides—including systemics and viricides.

**Rohm & Haas Co.** says its "Compendium of Plant Diseases," compiled as an aid for plant pathologists and others engaged in agricultural pursuits, has received distinction in the recent Sixteenth Annual Philadelphia Book Show. The book won awards both in the trade category in which it was entered and in the over-all classification which embraced all 89 books submitted. The compendium includes 125 color plates of as many different diseases.

**Potash deliveries** for agriculture in the U. S., Canada, Cuba and Puerto Rico by eight American producers and the importers totaled 1,115,991 tons of salts (647,764 tons  $K_2O$ ) during the first three months of 1961, according to the American Potash Institute. Excluding imports, this was a 10 per cent increase in salts and  $K_2O$  over the same period in 1960. Exports to other countries were 97,915 tons, a decrease of 19 per cent.



Virginia-Carolina Chemical Corp., Richmond, Va., uses more than 100 "Payloader" tractor-shovels in its 35 fertilizer plants located throughout the East, South and Midwest. The Hough machines do 24-hour duty for about 10 months of the year. Shown are two Model H-25 Payloaders with operating capacity of 2500 pounds working at the Memphis, Tenn., plant.

**Spencer Chemical Co.** has expanded its program to market Spencer products on a world-wide basis and to seek foreign investment opportunities. John C. Denton, president, says all sales agreements under which Spencer products have been marketed by U. S. based export agencies have expired and that Spencer Chemical International, a wholly-owned subsidiary formed in 1958, has taken complete charge of the company's overseas operations.

Carl Flesher, a former deputy director for ICA, has joined Spencer to head a program aimed at seeking out profitable capital investment opportunities overseas. He will locate at Spencer's general offices in Kansas City.

Coordinating offices in Luxembourg have been established for Spencer Chemical International by its president, Albertus Slingerland.

**San Francisco Chemical Co.** is planning five more phosphate plants with concentrators at its 27-square mile deposit at Brush Creek, near Vernal, Utah, according to Duncan L. King, president. When the expansion is completed, San Francisco will be employing about 1,000 men in its mining and milling operations at the northeastern Utah deposit.

### Associations Meetings

**The Chemical Market Research Assn.**, at its 21st annual meeting in New York announced as incoming president, F. Scott Godron, head of market research of Victor Chemical Works. He succeeds J. William Everson, Dow Chemical Co. Borden R. Putnam, Jr., of American Cyanamid Co., is the new president elect; F. R. Shutta, National Lead Co., treasurer; and V. R. Childress, Tennessee Corp., secretary.

**J. P. Ekberg**, director of marketing, Monsanto Chemical Co., Agricultural Chemicals Div., spoke on "Corporate Organization for Marketing to the Agricultural Industry" at the **American Marketing Assn.'s** 44th national conference in Los Angeles last month. Theme of the three-day conference was "Effective Marketing Coordination."



Ekberg

**"Colorado Sugar Beet King"** Harold Stark was presented a soil moisture gauge and a special plaque by the National Plant Food Institute at the recent Colorado Production Achievement Awards Program in Denver. Stark, of Ft. Morgan, is the first

two-time winner in the "10,000 Pound Beet Sugar Club in Colorado. Pictured with Stark (seated right) are (standing, left to right) Ed McMillan, Spencer Chemical Co. and president, Rocky Mountain Plant Food Association; and John Hall, president, Potash Co. of America and vice-chairman, NPFI board of directors. Fred Kemp, president of Great Western Sugar Co. and featured speaker at the program, is seated at left.



Kemp, McMillan, Hall and Stark

### Chemicals

**"Instant" nabam** is the nickname for a new dry form of nabam being marketed by Stauffer Chemical Co. The soluble, yellow, free flowing powder, which is mixed with a metallic sulfate for fungicidal application, is trade named Nabam 93-SP. It's available from Stauffer in 50-pound bags.

**Production** and distribution of a new Powco brand line of specialty base products for non-agricultural use has been announced by Fairfield Chemicals, Food Machinery and Chemical Corp. The recently acquired Powco trademark, reactivated and rejuvenated, includes toxicants for use in household and professional insecticides, pesticides and other specialty items. Among the products in the line are several specially conditioned forms of Dri-Die, W. R. Grace and Co.'s insecticidal silica aerogel, combined with Pyrenone.

Sevin also has joined Fairfield's Powco line.

A new, stabilized form of **methyl parathion** has been developed by Victor Chemical Works, Div. of Stauffer Chemical Co. Dust formulations of Stabilized T-80 methyl parathion are stable over a wide range of conditions, the company says.

A new method of making **wet-process phosphoric acid** has been developed by Nissan Chemical Industries Ltd. (Japan). Called a semihydrate process, it is claimed to yield as high as 97 per cent of the phosphate

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## NEWS OF THE INDUSTRY

values in phosphate rock, the *Sulphur Institute News* recently reported. Another benefit claimed for the new process is the high-quality gypsum by-product which is said to be suitable for wall board.

The semi-hydrate process, unlike the usual dihydrate process, is carried out in two stages—digestion and crystallization.

### People

American Cyanamid Co. has named Dr. D. D. Bondarenko research agronomist for the Agricultural Div. He will be involved primarily with screening and development of new herbicides. Before joining Cyanamid in April, he held a teaching position at Ohio State University.

Bennett Chemical Co. William F. Mierke joins the firm, to be in charge of sales. Mierke was an agronomist-sales representative for Tennessee Corp. for the past 6½ years, and before that was with International Minerals and Chemical Corp.'s Plant Food Div.



Mierke

California Chemical Co. Dr. L. L. Pechuman has been appointed to a new position in research and development with the Ortho Div., that of senior research representative. Before joining Ortho in 1939, Dr. Pechuman worked with Boyce Thompson Institute for Plant Research and had teaching experience at Cornell.



Fiss

Central Resources Corp. Robert L. Fiss, formerly of United States Steel Export Co., has joined CRC in New York. He will be active in this company's rapidly expanding international fertilizer activities.

Diamond Alkali Co. Howard E. Everson has been promoted to director of research, succeeding Thornton F. Holder, who died in April. Assistant director of research since 1958, Everson joined Diamond in 1951.

Frontier Chemical Co. Burton A. Burquest has joined Frontier to direct its technical service and field research program for liquid grain fumigants. He was with Pillsbury Co. for almost fifteen years in the grain department and in the department of economic biology.



Burquest



Caspari

W. R. Grace & Co. Davison Chemical Div. William Caspari, Jr., general sales manager, agricultural chemicals, was honored by one hundred friends and associates from many parts of the U. S. and Canada, May 19, at a dinner in the Sheraton Belvedere Hotel, Baltimore. It marked his retirement on May 31 after 44 years of service with Davison, the only company for which he ever worked. He will continue in a consulting capacity.

Hooker Chemical Corp. W. Newell Wyatt becomes manager, market development, of the Phosphorus Div. Prescott S. Olmsted succeeds him as manager, sales administration, of the division.

Eli Lilly and Co. Stanley J. Pieczarka, Ph.D., goes to the agricultural research staff as senior plant physiologist. He will design and conduct experiments on chemical control of plant growth.

Monsanto Chemical Co. Two of the company's technical personnel, James Lakemeyer of the Agricultural Chemicals Div., and Morris R. Ort, of the Research & Engineering Div., will return to college next fall on paid leaves of absence.

Donald E. Cayard has been appointed production superintendent for the Agricultural Chemicals Div. at Nitro, W. Va.



Gates

Morton Chemical Co. has named C. M. Gates southern region technical sales supervisor. He will cover 13 southern and southeastern states from his Atlanta, Ga., headquarters.

Niagara Chemical Div., Food Machinery and Chemical Corp., has appointed Titus Johnson to its field research staff at Jackson, Miss. A plant pathologist, he will be concerned primarily with screening new fungicides in field trials.

Nitrogen Div., Allied Chemical Corp. Promotions in the division's development center at the Hopewell, Va., plant include G. John Coli to director of development; Samuel W. Grossman to chief engineer; Irving F. Anderson to director of construction and economic evaluation; William W. Hoehing to manager of chemical engineering; William J. Michels to manager of evaluation; and William H. Wright to manager of operations engineering.

Foster D. Snell, Inc. The board of directors has elected Cyril S. Kimball president. Dr. Snell, who had been president and chairman of the board since the corporation was founded in 1930, continues as board chairman.



Elder

Swift & Co. James E. Elder in June became industrial chemical sales manager. The new post was created to provide improved customer service in the company's expanding industrial chemical business.

United States Steel Corp. has named Charles W. Bourg industry representative — agriculture, Market Development Div. He goes to the firm's main office in Pittsburgh from Salt Lake City, Utah, where he had been a market development representative since 1956, when he joined USS.



Bourg

Vickers Petroleum Co. Upon retirement of M. C. Lyons, former secretary, Robert F. Vickers became secretary of the firm.

### Suppliers

#### Briefs



Alexander

Chase Bag Co. has announced appointment of Eugene P. Alexander as manager of the company's Multiwall Bag Div. Alexander joined Chase in 1948 and has been sales manager of the company offices in both Detroit and Chicago. In 1959, he was made sales manager of the Multiwall Bag Div.

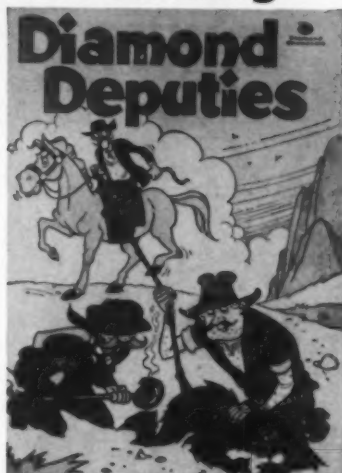
Clark Equipment Co. Fred Dolton has been named manager of national account sales for the "Michigan" line of construction machinery.

Highway Equipment Co. has named Schweiger's, Inc., Watertown, S. D., a new distributor. They will handle New Leader and Challenger spreaders, New Leader blenders and Model "C" bulk material haulers.

International Paper Co.'s board of directors has designated John H. Hinman honorary chairman of the board and appointed him director of woodlands. Richard C. Doane replaces Hinman as board chairman and continues to be chief executive officer. Lamar M. Fearing succeeds Doane as president, and Joseph P. Monge was elected vice president and treasurer.



## The Slurry



### THESE KILLERS ARE HEROES!

The most wanted of America's killers are really "goodies" these days. And Diamond Alkali Company's western approach dramatizes "America's famous weed and brush killers" in a way that should make youngsters (8-12) squeal with sheer delight! A cartoon-type full color booklet on its weed killers has been published by Diamond Alkali Co. The famous Diamond Alkali line-up:

"Crop Rider" for weeds in crops; "Fence Rider" for mixed brush and weeds; and "Line Rider" for brush con-

## Calendar

**July 5-7.** Midwest Branch, American Society of Agronomy, meeting, University of Wisconsin, Madison.

**July 11-12.** Empire State Soil Fertility Association, annual meeting, Hamilton College, Clinton, N. Y.

**July 16-17.** Plant Food Institute of North Carolina and Virginia, annual meeting, Asheville, N. C.

**July 18-19.** Annual Summer Fertilizer Conference, sponsored by Auburn University and Alabama Soil Fertility Society, Inc., Auburn University Campus, Auburn, Ala.

**July 30-August 2.** Soil Conservation Society of America, sixteenth annual meeting, Purdue University, West Lafayette, Ind.

**July 19-21.** Southwest Fertilizer Conference and Grade Hearing, Galvez Hotel, Galveston, Tex.

**August 10-11.** Mississippi Soil Fertility and Plant Food Council, annual meeting, Biloxi, Miss.

**August 16-18.** Agricultural Relations Council Seminar, The Woodner Hotel, Washington, D. C.

**August 16-20.** Canadian Fertilizer Association, annual convention, Manoir Richelieu, Murray Bay, Quebec.

**August 29.** Agricultural Engineering Field Day, Brookings, S. D.

**September 3-8.** American Chemical Society, national meeting, Chicago, Ill.

**September 3-8.** National Chemical Ex-

position, sponsored by American Chemical Society Chicago section, International Amphitheater, Chicago, Ill.

**September 11-15.** Instrument Society of America Instrument—Automation Conference (The Biltmore Hotel) and Exhibit (Memorial Sports Arena), Los Angeles, Calif.

**October 4-6.** Southeastern Fertilizer Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

**October 9-11.** Western Agricultural Chemicals Association, annual meeting, Hotel Claremont, Berkeley, Calif.

**October 12-13.** Northeastern Fertilizer Conference, Schine Inn, Chicopee, Mass.

**October 29-November 1.** National Agricultural Chemicals Association, 28th annual meeting, The Homestead, Hot Springs, Va.

**November 2-3.** Pacific Northwest Plant Food Association, annual convention, Hotel Gearhart, Gearhart, Ore.

**November 6-7.** Washington State Weed Association, annual weed conference, Chinook Motel & Tower, Yakima, Wash.

**November 8-10.** Fertilizer Industry Round Table, Mayflower Hotel, Washington, D. C.

**December 11-14.** North Central Weed Control Conference, Weed Society of America, St. Louis, Mo.

**December 13-15.** American Society of Agricultural Engineers, winter meeting, The Palmer House, Chicago, Ill.

trol along rights-of-way. Copies can be obtained through Diamond's dealers.

### GOOD COMMUNICATOR

R. P. Mullet, University of Tennessee

see extension entomologist, suggests to county agents that army worms require a "hands and knees, eyeball-in-the-mud method" to locate. Can't think of a better way of saying it!

## SERVE ALL YOUR FERTILIZER CUSTOMERS BETTER

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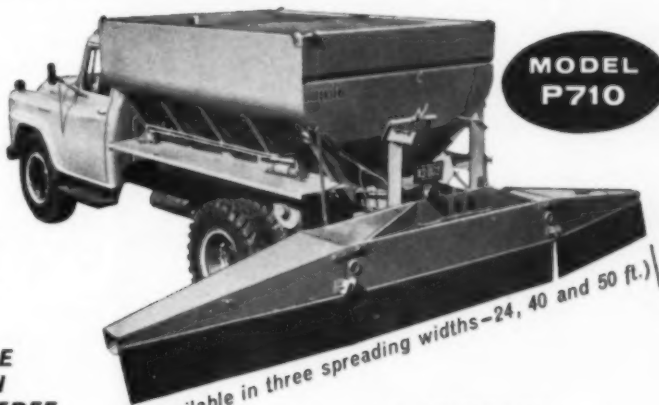
Model N-28 (2 ton) and the N-48 (4 ton) shown, have unique no-spring, individual wheel suspension—all wheels carry equal weight at all times. These tractor pulled "compacts" make money as rental units.

### WRITE, WIRE OR PHONE COLLECT

for further information about the P710 and the N-48, plus a full line of other bulk fertilizer spreaders and bodies, bulk feed bodies, bulk and sack bodies and unloaders.

### GET THESE SIMONSEN TROUBLE-FREE FEATURES

- Stainless Steel Apron
- Stainless Steel on all Critical Corrosion Points
- All-Weather Wheel Drive



MODEL P710

#### 4-13 TONS

Model P710 shown, has a 7 ton capacity. Other "P" models available from 4 to 13 tons. All "P" models are available in 3 spreading widths, and can accurately spread by test—75 lbs. per acre on up.

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1961

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- COMPANY by COMPANY
- STATE by STATE
- PLANT by PLANT
- PRODUCT by PRODUCT

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FARM CHEMICALS HANDBOOK is a *working* guide to the pesticide and fertilizer manufacturing industry. You will use the HANDBOOK as a sales guide, a manufacturing guide, and a buyer's guide. At the same time, it puts at your finger tips a ready reference to all the basic data involved in the farm chemicals industry.

You can reserve your copy of the 1961 HANDBOOK simply by filling out the attached self-addressed postage-free card. And because your advance order cuts costs (by enabling us to establish one economical press run), your reservation *now* entitles you to a special pre-publication price of \$5.00, or a 33 $\frac{1}{3}$ % saving.

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FARM CHEMICALS HANDBOOK has over 2300 listings of important pesticide and fertilizer manufacturers in 50 states, Canada, and Puerto Rico. Each listing gives the name of the company, address, phone, freight siding, and names of principal executive officers. Also the type of fertilizer plant is listed (complete with acid chambers, dry mixing, liquid mixing, etc.) and in the case of pesticide plants, the type of product produced (dusts, emulsions, fungicides, defoliants, etc.) Listings are geographical with an alphabetical index. Also, fertilizer spreaders and pesticide applicators are listed.

## PLANT FOOD DICTIONARY

Your copy of the 1961 HANDBOOK will also contain the revised Dictionary of Plant Foods, 52 pages of definitions and explanatory information on everything from Acidulated Bone to Zinc Oxide. The *Pesticide Dictionary* gives standard AAPCO definitions, lists principal basic suppliers and chemical formulae. There are over 500 different listings containing definitions and pertinent information on such materials as anisomycin, Thimet, and Zytron. Listed are Insecticides,

Fungicides, Herbicides, Fumigants, Diluents, Adhesives, Safeners, etc.

## BUYER'S GUIDE

The Buyer's Guide lists chemicals and services and equipment and supplies and from what companies they can be obtained. There is a complete alphabetical listing of over 780 suppliers to the farm chemicals industry. Never before under one cover has such a wealth of material been brought together for your use with all listings revised, corrected, and brought up-to-date each year.

In addition, there are State Plant Food Law Summaries (26 pages), State Pesticide Law Summaries (14 pages). Each State Summary contains the names and addresses of State Control Officials plus any significant changes in the law which may have taken place in the preceding year.

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Surveys show the HANDBOOK is referred to on the average of 8.4 times a month by each subscriber. Every 30 seconds, day in and day out, a copy of the HANDBOOK is opened to give vital information to make important decisions. Now is the time to make sure that you will have the advantage of this valuable reference. Here is what one important user of the HANDBOOK had to say: "We probably refer to FARM CHEMICALS HANDBOOK more frequently than all of the other texts and publications in the field combined."

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FARM CHEMICALS HANDBOOK, Willoughby, Ohio

PUBLICATION DATE - SEPTEMBER 1<sup>ST</sup>

## STOCK CONTROL SYSTEMS

(Continued from page 14)

style is going to be in vogue next year. Let us take the various formulas of fertilizer as an example and show how to plot the anticipated demand.

CHART FOR SELECTING MERCHANDISE

Formula	Tons Sold by Year			
	1957	1958	1959	1960
Mixture A	10	20	60	40
Mixture B	90	80	60	55
Mixture C	100	80	40	60
Mixture D	20	50	80	70

From this chart it is easy to determine that formulas A and D are increasing in popularity, while B and C are gradually decreasing in popularity. However C will bear watching. It could be one of those old reliable mixtures that has a regular cycle.

This probably serves to illustrate, as well as anything else, that most people like a change. They get tired of doing old things day in and day out. They don't want to change much, but they do want to change a little. A chart like this can be made up quickly and easily.

These two forms are adequate for controlling highly seasonal items which

move in large volume with low markup and are carried on consignment. They are much too careless for merchandise that you have your own money invested in. But these two little forms will give you an excellent idea of goods that you want to carry on consignment, because even though you may not have anything invested directly in the merchandise—there is nothing free in the world.


Merchandise under your roof takes up space, requires help, costs insurance, and might even cost you in taxes. Furthermore, if you have to work harder for less sales, and perhaps even cut prices in order to move it, all of this will reduce your profit at the end of the year.

For better sleep at night, and less worry about profits, these two forms taken annually will give you the control you need. ☆

## SPHALERITE for zinc additions

(Continued from page 26)

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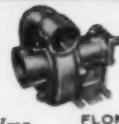
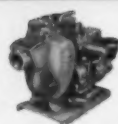
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## Chemicals

### VOLUME COUNTS

It's the volume that counts in applying dry dust insecticides. In buying inerts, you pay by the pound. Celite, a new product by Johns-Manville, saves you money by giving 10 times more volume than equal weight of other mineral fillers. And its neutralizing of dense let-down agents prevents packing down and pocket forming of inactive ingredients. Celite assures uniform poison dispersion on all foliage. For further information on Celite, CIRCLE 144 ON SERVICE CARD

### STABILIZED METHYL PARATHION

Several significant advantages to formulators have been discovered with the use of Stabilized T-80 methyl parathion. Because of its 80% concentration, less material need be sprayed on absorbent carriers enabling dust bases to remain drier and free-flowing. Because of its stability, this chemical is resistant to heat and hydrolysis. There is no catalytic degradation resulting from contact with clays and absorbents. To receive the eight-page research report covering Stauffer Chemical Company's Stabilized T-80 methyl parathion, CIRCLE 145 ON SERVICE CARD

### ORGANIC COMPOUNDS

Agricultural chemical groups and industries will find this new 32-page booklet by Du Pont, covering formamide, of value. Although available commercially for many years, new information on formamide has been developed concerning its use as a chemical intermediate in the synthesis of nitrogen containing heterocyclic compounds. Another application is its use as a delayed gel-producing reactant for sodium silicate. To receive a copy of this booklet, CIRCLE 146 ON SERVICE CARD

## Process Equipment

### CORROSION-RESISTANT TANKS

A new six-page Bulletin 45-115, by Black, Sivalis & Bryson, Inc., discusses the manufacturing method and features of the glass-resin material used in the production of their Poxylas tanks. The new line includes four standard sizes with capacities ranging from 4600 to 16,000 gallons. Lower capacity tanks are being developed. Also included is a "Poxylas Corrosion Resistant Chart" for use in the application of Poxylas tanks for corrosive service. To receive this bulletin, CIRCLE 147 ON SERVICE CARD

### GRAVIMETRIC FEEDER

Rugged, compact, and completely automatic in operation, B-I-F Industries' new feeder continuously weighs and feeds dry, flowable material at a fixed rate. Ideally suited for proportional feeding of solids with other solids or liquids, it makes a versatile component in systems designed for the processing of chemicals, foods or minerals. Paced by other equipment, it can control or propor-

tion other components in a system. Safe and compact construction makes it possible to mount on, over or beside other equipment. To secure the four-page, illustrated catalog describing this new feeder, CIRCLE 148 ON SERVICE CARD

### HEATING AND COOLING

PLATECOIL by Tranter Manufacturing Inc., is used not only in the heating of oil storage tanks and portable asphalt plants, but also in the cooling phases of synthetic rubber production, of distillery slurry, and the cooling of superphosphoric acid. PLATECOIL is fabricated and formed to your specifications for the particular purpose or need. It is capable of operating pressures up to 250 psig. For more information on how PLATECOIL can be applied to your specific heat transfer requirements, CIRCLE 149 ON SERVICE CARD

## Materials Handling

### SPECIAL FRAME

One takeup frame cannot meet all application requirements, so Link-Belt Company has a complete line in seven frame styles, all equipped with sleeve, ball or roller bearings. A new 16-page Book 2741, *Takeups*, is now available, describing 320 different takeup units, which provide easy, positive means for adjusting head or foot shafts on conveyors or elevators. The book also contains descriptions of Link-Belt's new line of multi-bearing frames designed for direct mounting of ball, roller, babbitted or bronze pillow blocks. For your copy of this book, CIRCLE 150 ON SERVICE CARD

## Packaging

### MULTIWALL PERFECT SEAL

The protection of polyethylene and the strength of rugged multiwall have been combined by Raymond Bag Corporation to give complete protection when packing and shipping hygroscopic or other difficult packaging products. Multiwall sacks can cut your costs up to 50% by replacing space-consuming, rigid-type containers. Perfect sealing insures constant quality from packing through final

use. These containers can be used for products requiring either retention or prevention of moisture. For information concerning this economical answer to the "hard to package product," CIRCLE 151 ON SERVICE CARD

## Application Equipment

### LIQUID SPREADER

Simple, practical, economical and fully automated, this Baughman Rapid Spread Liquid Fertilizer Spreader is easily mounted on any flat-bed truck or farm wagon. It uses air pressure powered by a compact motor and pump. No operating parts come in contact with the liquid. The liquid is dispensed in droplets rather than spray, which eliminates blow away. Even with the spreading switch turned off, the machine can run pressure without damage, mixing and heating the tank contents. For further information on this spreader, CIRCLE 152 ON SERVICE CARD

### SPEED-SPRED

For spreading bulk or bagged material, Calhoun Manufacturing Company's SPEED-SPRED can handle up to 40 feet in width, accurately and evenly. With a 2,000-pound capacity, there is no bridging of material. The quarter-inch settings on the positive flow control gate enables the distribution of 65 to 1500 pounds per acre. It can be operated by a 3 hp engine. All wearable parts are replaceable. To receive literature on the SPEED-SPRED, CIRCLE 153 ON SERVICE CARD

### CUBITAINER PACK

Hedwin Corporation has recently published two brochures on Cubitainer, their composite liquid container consisting of semi-rigid, molded polyethylene cube, a corrugated or wirebound wood box, and a suitable liquid-tight closure. It is manufactured in four sizes — one-quart, one-gallon, five-gallons and fifteen-gallons—with a choice of four closures — heat-sealed spout, plug, screw-cap, or Flex-Spout. Cubitainers are lightweight — tare weight is only 1/6 that of glass; easy to use; durable; easy to fill; and space saving. To learn how you can use Cubitainers in handling your products, CIRCLE 154 ON SERVICE CARD

### PAIL RACK

A new and modern method of dispensing liquids from 5-gallon containers has just been introduced. The Pour-Easy pail rack provides a definite service by allowing you to dispense from this size container with ease and efficiency. The perfectly balanced container eliminates costly waste of spilling. For complete details about this new pail rack manufactured by Hub States Chemical & Equipment Co., CIRCLE 155 ON SERVICE CARD

See page 38 for information on  
these Reader Service Numbers:

156—Easier-Better

158—Tote Barrel

157—Automatically

159—Two in One

160—At a Glance

To use Reader Service Card on page 10: Circle number of literature you want. Print or type your name, position, company and address. Clip and mail.





## NEW AQUATHOL FOR FAST, SAFE CONTROL OF UNDERWATER WEEDS

In just a few days Aquathol can clear ponds and lakes of troublesome underwater weeds . . . without harm to fish or other water life . . . and leave water safe for domestic and recreation uses. Developed exclusively by Pennsalt, Aquathol is easy to apply—effective.

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- 1—Standard 6' 6" x 60' rotary dryer.
- 2—2600 gal. T316SS tanks, coils.
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- 1—Worthington 70 cu. ft. rot. batch blender.
- 1—Raymond 66" 6-roll mill, rebuilt.
- 2—Raymond 50" 5-roller hi-side mills.
- 2—Davenport 8' x 60' rot. dryers, 7/16" welded.
- 1—7'-6" x 62' rotary cooler, 1/2" welded.
- 1—Louisville 5' x 25' steam-tube dryer.
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**LARGE CHEMICAL COMPANY** supplying plant foods, pesticides and feed additives needs salesmen with 3-8 years selling experience in one or more of these areas. B.S. degree in agriculture, chemistry or chemical engineering preferred. Send resume to **W. R. Hayes, Monsanto Chemical Company, Agricultural Chemicals Division, St. Louis 66, Missouri.**

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# NEW & NOTEWORTHY

## EASIER—BETTER

A new tractor shovel featuring rear-mounted, stand-up type control is now available from Clark Equipment Company. This new machine allows the operator to mount and dismount quickly, saving labor and fatigue.

The new unit is powered by a 42-hp diesel engine and includes all of the famous Clark



engineering improvements. Lifting capacity is 3520 pounds, and the Model 12B incorporates a short turn radius for maximum maneuverability. All bucket controls are hydraulic.

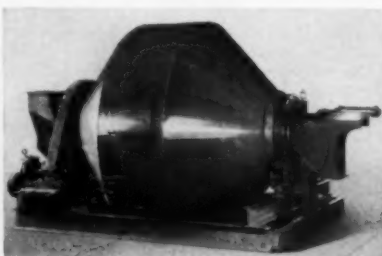
For further details,

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## AUTOMATICALLY

Here is a new mixer with a capacity up to 360 cubic feet. The units can be equipped with internal indicating devices so that complete mixing is done by remote control.

The new units mix faster, are designed with



larger intake and discharge ports. Trunnion rollers and rings are made of wear-resistant Meehanite iron.

Here is a sure way to cut costs and increase production. Complete information about Munson Mill Machinery Company's new mixer will be sent to you if you

CIRCLE 157 ON SERVICE CARD

## TOTE BARREL

A new polyethylene "tote barrel" is now available in 45-gallon and 25-gallon sizes. The barrel retains all the desirable characteristics of polyethylene. It is completely waterproof, light in weight, dent-proof and resistant to corrosion. This barrel, manufactured by Delaware Barrel & Drum Company, Inc., is an excellent tool for plant housekeeping, industrial and commercial trash removal, bulk material handling, institutional linen and waste collection. It has been performance-tested to 0° F., and is an eye-appealing unit which is

easy to clean. To learn more about this handy "tote barrel"

CIRCLE 158 ON SERVICE CARD

## TWO IN ONE

A new bag printer combined with a bag sewing machine speeds fertilizer and pesticide loading. The new printer, developed by Bemis Bro. Bag Company, uses a Porelon ink roll which eliminates the use of fluid inks, solvents, reservoirs, transfer rolls, etc.

The machine is simple to operate and main-



tain. Printing speed can be adjusted to the speed of your conveyor system and sewer. Various colors of ink can be used.

Should you want more details on this time and money saver,

CIRCLE 159 ON SERVICE CARD

## AT A GLANCE

Several pesticide and fertilizer companies are using the Select-O-Level indicating device for reading the level of liquids stored in non-pressure tanks.

Through the use of selector switches, the 12-inch dial gives instant readings for up to



eight tanks. Pilot lights indicate which tank is being measured. To make it easy, the unit can be located 500 feet from the tanks, and will read any level up to 33 feet.

Information on the Select-O-Level indicator devices, manufactured by Bernard & Leas Manufacturing Co., Inc., can be yours by merely

CIRCLING 160 ON SERVICE CARD

FARM CHEMICALS



# See what you get... and can Guarantee

with only 20 pounds of  to a ton of fertilizer

Percent to total, by weight	FTE FORMULA 501	FTE FORMULA 502
<b>B</b> BORON	.02	.028
<b>Cu</b> COPPER	.02	.02
<b>Zn</b> ZINC	.04	.04
<b>Mn</b> MANGANESE	.049	.097
<b>Fe</b> IRON	.12	.039
<b>Mo</b> MOLYBDENUM	.0013	.0013

You get all six minor elements in a single product—and as little as 1% in your mix will meet most requirements for trace-element additives.

Being *fritted* and slowly soluble at a controlled, pre-determined rate, FTE won't leach out—or become fixed in the soil. It stays in the root zone and releases the nutrients as needed, all through the growing season.

Two standard formulas are immediately available.

Others are being developed for specific areas of the country. All can be *safely used anywhere*, and on *any crops*, simplifying both manufacturing and marketing of fertilizers.

If you're not now using FTE, you'll find it profitable to do so. It costs but little, and can make a big difference—in the results your customers get; in your own future sales and profits.



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## PATENT REVIEWS *By Melvin Nord*

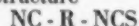
### DRYER FOR FERTILIZER

**U. S. 2,973,191**, issued Feb. 28, 1961 to Augustus J. Sackett, Jr., and assigned to The A. J. Sackett & Sons Co., provides a dryer for fertilizer materials. The principal object of the invention is to promote the drying at a lower temperature than has previously been used. This is done primarily by admitting a larger quantity of air to the furnace, that air being introduced in a manner to avoid drawing the flame from the burner. One of the principal reasons that it is desirable to use low drying temperatures is to avoid driving off the low volatile constituents of the material, such as the ammonia in fertilizer. The air is introduced circumferentially of the furnace and it is directed in such a manner as to focus it at a point within the path of the flame, but spaced well from the burner toward the dryer so that there is no tendency for the flame to leave the burner.

The apparatus is shown in the figures.

### PESTICIDES

**U. S. 2,972,561**, issued Feb. 21, 1961 to Albert J. Suhovecky and Philip H. Santmyer, assigned to Monsanto Chemical Co., describes a method for treating soil infested with fungi and nematodes, which consists of dispersing in the soil a toxic amount of a compound having the structure

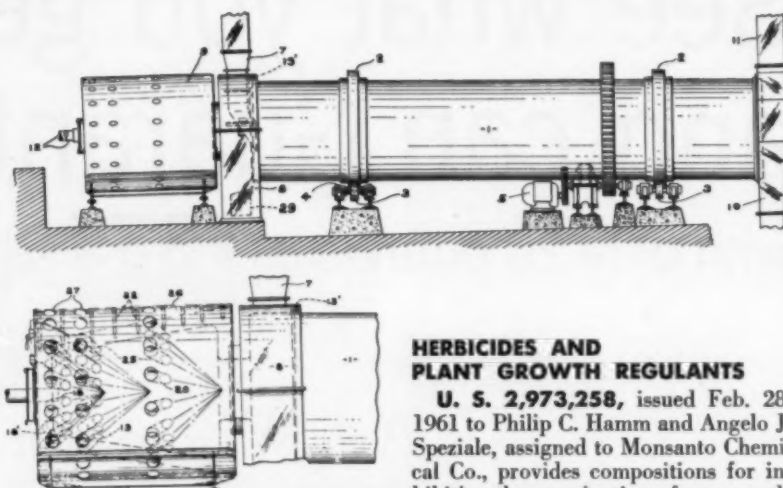


where R is an alkylene radical having 2-14 carbon atoms.

**U. S. 2,972,563**, issued Feb. 21, 1961 to Sidney B. Richter and assigned to Velsicol Chemical Corp., provides new plant fungicides consisting of certain halogenated phenyl cyclopentanones.

**U. S. 2,973,297**, issued Feb. 28, 1961 to Mattheus H. C. M. Bakkeren and Julius J. Schuur, assigned to N. V. Aagrunol Chemical Works, discloses the fungicidal properties of quaternary ammonium salts of dithiocarbamic acids.

**U. S. 2,974,030**, issued March 7, 1961 to Robert J. Geary and assigned to Plant Products Corp., provides an insecticidal plant mulch consisting of 0.1-5% of a nucleary polychlorinated organic contact insecticide, 0.05-5% of



a systemically active insecticide, 80-99% of mulch materials, and 1-18% of a decatalyzer (urea or hexamethylene-tetramine).

**U. S. 2,974,083**, issued March 7, 1961 to Moshe Neeman and assigned to Wisconsin Alumni Research Foundation, provides insecticidal DDT compositions for destroying insects resistant against the action of DDT alone. An additive is added, consisting of p-chlorobenzenesulfonic acid-N-di-(R)-amide, where R is an alkyl group containing 2-7 carbon atoms.

**U. S. 2,974,084**, issued March 7, 1961 to Raymond L. Mayhew and Earl P. Williams, assigned to General Aniline & Film Corp., discloses the nematocidal properties of alpha-halogenated-gamma-butyrolactones.

**U. S. 2,976,206**, issued March 21, 1961 to Edward C. Baillie and Lewis F. Stevens, assigned to Pittsburgh Plate Glass Co., provides a pesticidal composition which when applied to apple trees is effective to control European red mites, apple cedar rust, apple scab, and apple powdery mildew. The composition contains sulfur, ferric dimethyl-dithiocarbamate, and 2,3-dichloro-1,4 naphtho-quinone.

**U. S. 2,976,207**, issued March 21, 1961 to Randel Q. Little, Jr. and Jack F. Bussert, assigned to Standard Oil Co., discloses dihydroxy-aminotriazine pesticides which are useful against insects, mites, and fungi.

### HERBICIDES AND PLANT GROWTH REGULANTS

**U. S. 2,973,258**, issued Feb. 28, 1961 to Philip C. Hamm and Angelo J. Speziale, assigned to Monsanto Chemical Co., provides compositions for inhibiting the germination of grass seeds by unsymmetrical alpha-haloacetamide herbicides.

**U. S. 2,974,444**, issued March 14, 1961 to Channing B. Lyon and Dougal H. McRae, assigned to Rohm & Haas Co., provides a process of producing hybrid tomato seed, involving the use of 2,3-dichloroisobutyric acid or its water-soluble salts on tomato plants.

**U. S. 2,976,139**, issued March 21, 1961 to Robert W. Leeper and Victor C. Fusco, assigned to Olin Mathieson Chemical Corp., provides a method for promoting the flowering of pineapple plants with 2-beta-hydroxy-ethylsemicarbazide.

### TRACE ELEMENT SOLUTIONS

**U. S. 2,976,138**, issued March 21, 1961 to Jackson B. Hester and assigned to Suburban Propane Gas Corp., provides a method of producing an ammoniacal trace element soil additive composition.

Molybdc or boric acid is dissolved in a strong aqueous ammonia, together with trace element salts of metals (copper, manganese, zinc, nickel, and cobalt) and ammonium sulfate. The trace element salts and the acid are dissolved in proportions to form ammonium and complex ammonium salts of the trace elements. The amount of aqueous ammonia is in excess of that necessary to react with the trace element salts. Thus, the resultant ammonium and complex ammonium salts are dissolved in an aqueous ammoniacal solution.

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## Are you a "miracle man"?

If you're a one man marketing department, as is the case in so many farm chemicals concerns, there may be many duties that you find yourself skipping over. While this can't always be helped, you are in effect selling yourself and your company short.

Al N. Seares, president of Alderson Associates, Inc., marketing and management counsel of Philadelphia, recently made this statement in "The Pennsylvania Business Survey":

"Were we to run an advertisement for a marketing executive who is fully equipped to cope with present and future requirements, the specifications would need to read something like this:

### WANTED

Modern Marketing Executive—Well educated in business organization, financial management, materials handling, and transportation . . . with an applied understanding of psychology, sociology, physics, mathematics, chemistry, communications, semantics, philosophy, operations research, and behavioral sciences. Must be an inspired leader of men, able to team up with his marketing organization and to follow through on company policies. Must have a working knowledge of the following marketing functions:

Market research	Human relations (empathy)
Product planning	Sales force management
Sales forecasting	Packaging and displays
Sales budgets	Advertising
Manpower determination	Sales promotion
Compensation incentives	Direct mail
Facility requirements	Evaluation of competition
Recruitment	Pricing strategy
Training	Customer relations
Supervision	Order servicing
Motivation	Stock levels—turnover
Market coverage	Product analysis
	Communications
	Profit analysis

### Well, how do you rate?

Seares went on to explain that while this may seem somewhat exaggerated, it is a fact that marketing executives today must either be well informed about these subjects or must know where to get such information promptly.

"In order to make himself the miracle man he must become," Seares warned, "the marketing executive must take advantage of every opportunity for personal development . . ."

And, of course, he got in his plug for consultants by pointing up the importance of using the services of consultants like Alderson Associates "who can contribute to the success of the organization."

To this we add "amen"—if it's the right consultant. Large corporations like Monsanto make maxi-

mum use of these marketing experts in their periodic reorganizations. (See March issue—"Marketing—A line or staff function.")

Seares then directed his readers' attention to a survey conducted by the National Sales Executives Club in which they determined the top 15 reasons why marketing executives miss the responsibilities target. A list of 67 reasons was sent to the presidents of 3,700 companies. Here are the top 15 reported:

1. Inability to direct the efforts of salesmen.
2. Inability to develop new salesmen.
3. Lack of administrative ability.
4. Lack of vision and imagination.
5. Inability to arouse sales enthusiasm.
6. Ineffectuality or lack of interest in establishing sales training or retraining programs.
7. Lack of creative selling ideas.
8. Reluctance to consider new marketing potentials and plan ahead to take advantage of them.
9. Lack of sales leadership.
10. Too little field work.
11. Superficial recruiting and improper selection of salesmen.
12. Too great an addiction to profitless volume and indifference to profits from selective selling.
13. Inability to formulate complete selling programs.
14. Weakness in human relations (lack of empathy).
15. Failure to use sales promotion effectively.

Recently, FARM CHEMICALS has been emphasizing *management*. (See "What Kind of a Manager Are You?" and "Training and Development"—May issue). Seares had something interesting to say about the word "management," which he feels sums up rather neatly the objective responsibilities of the marketing executive. He said:

"First let's drop the last letter—"T." Note the two significant words that remain: *Manage* and *men*. Note also that in the word *manage* we have the word *age*, denoting the important element of time. Now, by dropping *age*, we have left two key words which make for good management: *man* and *men*. Now may I suggest we put back the last letter and we have management to a "T." It is this kind of working relationship that provides teamwork and understanding, with the leadership to make materialize the ambitions, happiness, financial security, and plans of every member of a successful marketing team."

Whether you're a one man Marketing Department or not, this may be the best advice that can be offered for these times:

*Know thyself—and know where to get expert help!*

  
EDITOR



# How Union-Camp's 5-Star Plan saved multiwall user up to \$450 per carload of bags

This is a new kind of "Big-Inch" story.

A major mid-west packer\* wasn't convinced his multiwall bagging operation was all it might be. Could Union-Camp's 5-Star Multiwall Plan help?

To get the answer, Union-Camp multiwall specialists visited the plant. They found that the automatically filled bags occasionally stuck in the sewing head. Also, that the sewing line tended to "belly" and form an arc pattern. The result was considerable loss in production and frequent breakage. Another problem—the bags didn't warehouse well.

## "Sew-Straight" Solution

After completing their analysis, the Union-Camp men suggested installing a "Sew-Straight" attachment right onto the sewing head. The bags could now be closed with an "E" head in a perfectly straight line. And only 1 inch from the top of the bag. That single inch made all the difference.

## Less paper—less breakage

To begin with, shorter bags could be used. The savings in paper alone cut

the firm's multiwall costs from between \$350 to \$450 a carload. Imagine the savings based on several dozen carloads a year!



Before and After. Old, semi-circular closure pattern (left) and the new closure (arrow). Note the straight sewing line, and how close it is to the top of the bag.

The new attachment also speeded production by eliminating sewing head jam-ups. Moreover, since the top closure is now identical to the factory-sewn bottom closure, the bags form a perfect pillow shape—no awkward ears. This makes them easier to handle . . . easier to stack. And there's less breakage and fewer rejects.

## How much could you save?

Perhaps an idea unearthed through Union-Camp's 5-Star Plan could save you money. The chances are excellent. For every day, multiwall users, large and small, are reducing their multiwall costs by capitalizing on this comprehensive packaging service. Their savings run from a few thousand dollars to over \$100,000 a year.

Apart from bag construction, this economy program covers bag design, specifications control, packaging machinery, and a survey of your materials handling operation. And it costs you nothing—regardless of the brand of bags you now use.

## FREE 16-PAGE BOOKLET

Write Dept. M-3 today for a free copy of Union-Camp's new 5-Star Plan booklet. It describes many case histories showing how packers like yourself have achieved greater efficiency and economy in their multiwall operation.



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